

MOTOR AGE

A Day With the Motor Farmer



AFTER THE WHEAT WAS HARVESTED THE TRACTOR THRESHED IT AT THE RATE OF 1,000 BUSHELS A DAY

IT was the time of wheat harvest in southern Indiana and from the car window could be seen the fields of yellow grain falling into the embrace of the rattling binders to appear in a moment as neatly tied bundles. Here and there the work was stopped while horses, steaming in the heat, were replaced by fresh animals from the barns. Upon alighting at the town of Washington, a bronzed young man with a businesslike air ushered us into a battered touring car, the tonneau of which was loaded with repair parts for harvesters and plows.

During the 5-mile drive to the Graham farms, Ray Graham, the manager, called attention to a distant popping, somewhat reminiscent of the speedway races. Before long the car pulled up in a vast field of wheat shoulder high, in which a monster iron horse was circling the field and pul-

By Darwin S. Hatch

ling four binders in its train, each cutting and binding a swath of grain 8 feet in width. So rapidly was the 32-foot strip of grain cut that the water monkey who followed the harvesters in a buggy found it necessary to trot his horse frequently to keep from being left behind.

Almost a Non-Stop Run

The most impressive feature was not so much the speed of travel, as the infrequency of stops. Only once during 12 hours did a cessation of the insistent popping of the exhaust signalize a stoppage of the motor, and that was when one of the binders failed to tie the bundles properly when a particularly heavy patch of wheat was entered. The large field, 400 acres in extent, allowed long runs between turns

and the outfit harvested an average of 100 acres a day during the entire wheat harvest.

When the harvest was over and the wheat shocked up in regimental array over the fields, the gasoline tank wagon was hooked on behind the four binders and pulled to the sheds. A gang plow which turned eight furrows at a time was substituted for the reapers and plowing was commenced in the next field. Each day the tractor with its eight plows turned over 20 or 30 acres of ground to a depth of from 8 to 12 inches.

Soon the wheat was ready for threshing, and the ubiquitous motor was again called into play. This time the motor tractor hauled the threshing machine from one field to another and then, by means of an auxiliary shaft and driving pulley, operated the separator and blower. In moving the

threshing outfit about the farm it was not necessary to even disconnect the belt between the tractor and the separator. From 1,000 to 1,500 bushels of wheat were handled in a day, depending on the yield, at a cost of about \$50, or, taking the low figure for the daily run, at a cost of 5 cents a bushel.

In addition to its service in harvesting, plowing and threshing, the gas tractor is put to many other uses on the Graham farms and other farming operations have been entrusted to the motor in place of the horse. Planting, drilling, disking, harrowing and dragging represent some of the many ways in which Ray Graham has utilized his iron horse, and at every job it has outdistanced its equine forerunner.

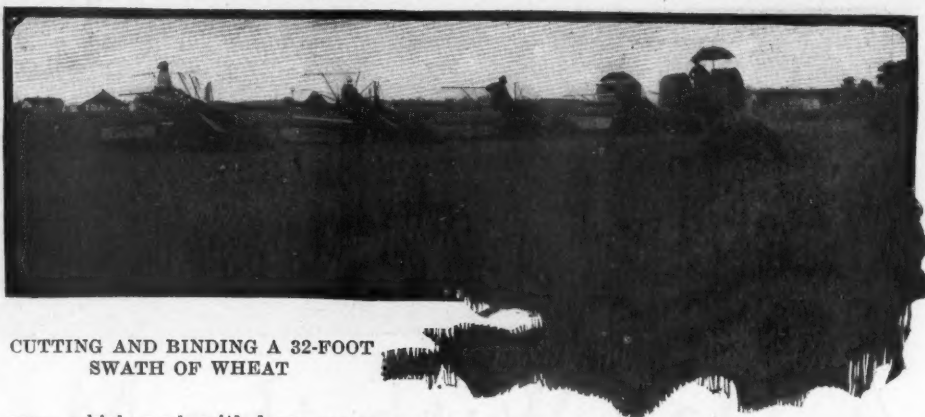
Big Tractor a Monster

The big tractor is known as the Big-Four 30, as it has a four-cylinder motor



TWO MEN PLOWING EIGHT FURROWS AT A TIME—LARGE FIELDS ARE NEEDED FOR BEST RESULTS WITH THE TRACTORS

and has a draw-bar pull equal to that of thirty horses. This does not mean that the engine itself is only 30 horsepower, for each of the four cylinders has a bore of 6½ inches and a stroke of 8 inches and it develops much more than 30 horsepower. It is water cooled and a magneto is employed for ignition of the charge. The power plant looks and performs just like the motor of almost any standard touring car. Final drive is obtained by means of spur



CUTTING AND BINDING A 32-FOOT SWATH OF WHEAT

gears which mesh with large master gears fastened to the rims of the driving wheels.

Noticeable above all else about the tractor is the size of the driving wheels. These are 8 feet in diameter with a face 2 feet in width. The faces of the wheels are studded with conical steel spurs which take firm hold upon the ground and make slipping almost impossible. The great height of the wheels and width of the rims prevent the tractor settling in the ground and make it difficult to stall the engine. For use as a stationary power plant, there is provided a cross shaft to which a driving pulley may be attached for belt connection to the work.

In plowing, a mechanical steersman is attached to the front of the tractor. With this automatic guide, the engineer need pay no attention to the steering except in turning at the end of the furrow. This leaves him free to overlook the work of his engine and plows. The automatic steering device guides the engine and turns a straight furrow. The relatively light weight of the engine, combined with the high broad wheels, and the hold on the ground obtained by the conical spurs, allow it to plow to the very edge of sloughs and to pass through shallow places, resuming the furrow in a straight line.

Four Binders In a Line

When harvesting is in progress the four binders are hitched one behind the other in such a way that each following binder always cuts a swath just inside of the 8-foot width cut by its leader. The tractor runs over the stubble and the reapers are each offset 8 feet. It would be almost an

COST OF HARVESTING WHEAT WITH TRACTOR

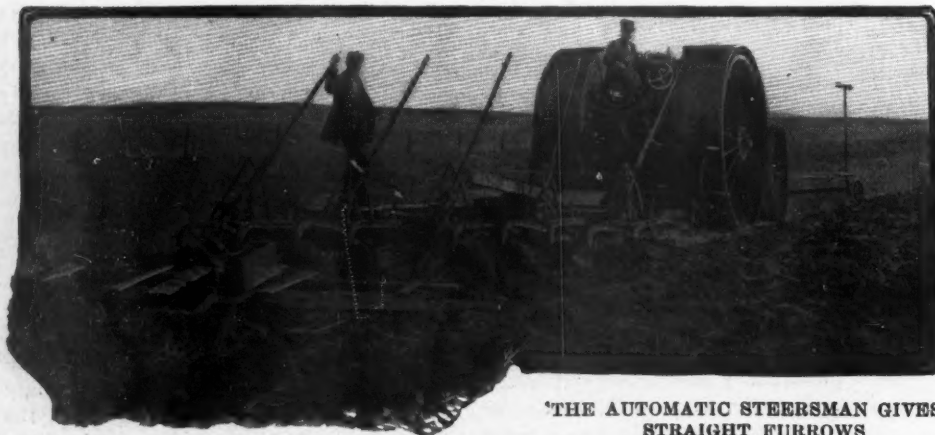
Cutting and binding 100 acres of wheat a day:	
Gasoline, 40 gallons, at 10c.....	\$4.00
Oil, 4 gallons, at 30c.....	1.20
One engineer, at \$2.75 per day....	2.75
Four binder men, at \$2 per day....	8.00
Interest on investment at 6%....	.84
Depreciation and repairs at 15%.	2.20
Total cost for 100 acres....	\$18.99
Cost per acre.....	.19

impossibility to use several binders in a train in this way were it not for a special attachment by means of which the man on each binder guides it, to a certain extent independently of the rest. This device is known as the Hansmann binder hitch and the chief factor of it is an offset pole which is adjustable from the seat by means of a small steering wheel. By turning the steering wheel just as the driver of a car turns the front wheels, the pole is offset more or less, giving any desired width of cut and allowing the binders to turn the corners without missing or running over any standing grain.

While Ray Graham may be described as a motor enthusiast, he is not a faddist on the subject. Gas motors with him are a business proposition, and he is using them only because his experience has shown them more profitable for his work than horses can be made to be. The 2,500 acre farm of which he is manager is run on as strictly a commercial basis as any store or factory. A complete bookkeeping system enables him to keep exact account of his expenditures and income, and every cent of expense is charged to the machine man or operation responsible for it. Not only is the cost of traction farming definitely known, but the expense of doing the same work by the usual methods of horse traction on this farm is also beyond guesswork. Gas tractors have been in use on this farm for only 2 years. The preceding 3 years of Ray Graham's management saw the land worked in the good old way, and as accurate records were kept then.

Cost of Plowing and Harvesting

The figures on the cost of plowing and harvesting with the gas tractor on the Graham farms are interesting as they show what can be done with this power where the farm has been arranged for its



THE AUTOMATIC STEERSMAN GIVES STRAIGHT FURROWS



HARVESTING 100 ACRES A DAY IN
WHEAT SHOULDER HIGH

COST OF HARVESTING WHEAT WITH HORSES

Cutting and binding 100 acres of wheat a day, assuming 20 acres per day per four-horse binder:	
Twenty horses, at \$1.50 per day.....	\$30.00
Five men, at \$2 per day.....	10.00
Total cost for 100 acres.....	
Cost per acre.....	\$40.00
Difference in favor of tractor....	.29

use. In plowing, the gas tractor pulls eight plows and turns over an average of 20 acres a day for the season. This requires 50 gallons of gasoline which costs 10 cents a gallon, and 4 gallons of oil, at 30 cents a gallon. The labor cost is the salary of the engineer at \$2.75 a day and that of a plow tender at \$2 per day. On an investment of \$2,800, the interest at 6 per cent is about 85 cents for 1 day of plowing and the depreciation and total cost of repairs, which have been very small so far, but are assumed at a liberal figure of 15 per cent a year, amount to \$2.20. This gives a total cost of \$14.00 per day for plowing, or 70 cents an acre.

The cost of horse traction in farming operations is not so easy to determine as that of mechanical traction. In making an estimate of the cost of operation with horses it is scarcely possible to get the exact expense because horses must be fed and cared for during idle seasons in order that they be fit for service when the time for profit-making labor arrives. It is figured that the feed alone for the average farm horse cost \$90 a year and there always is a number of weeks in the year in which the animal is of no service. The cost accounts on the Graham farms have shown that for each day of actual profit making work on the farm approximately \$1.50 has been expended on every horse or mule.

Force Necessary to do Work

To plow 20 acres a day as it is done by the tractor requires eight teams and eight men. The sixteen horses at \$1.50 represent a daily cost of \$24 and the drivers each get the equivalent of \$2 per day, that is, the 20 acres are plowed at a total cost of \$40, or \$2 an acre, nearly three times as much as with tractors. Of course, the cost of labor varies in different localities and between rush and slack seasons. Like-

wise, the daily cost of horses and the amount of ground worked in a day depends upon other conditions, but the difference obviously can never be great enough to affect the comparative figures very much.

With four reapers trailing behind the tractor, the outfit cuts and binds 100 acres of wheat a day. Forty gallons of fuel are required and 4 gallons of oil. The engineer, of course draws the same wages as in plowing, but this time four men are needed as binder tenders in place of the one man on the plows. The men on the binders draw \$2 a day each, but the other daily expenses remain the same. The total cost of the day's work in the harvest field is \$19, or 19 cents per acre.

Taking 20 acres a day as the average day's work of an 8-foot binder with four horses, it would require five men and twenty horses to accomplish the same results as the tractor does with four binders. With the horses charged at \$1.50 per day and the men at \$2 the cost of harvesting the 100 acres with animal traction amounts to \$40, or a cost per acre of 40 cents. This represents a saving of 21 cents an acre in favor of the gas engine, or over 1 cent a bushel on the average yield.

Thirty Horses Replaced

Without reference to this farm in particular it is hard to state figures which accurately represent the work which the modern gas tractor will do, for the reason that conditions vary so greatly. For instance, in breaking, it makes a great deal of difference whether the ground is packed hard and dry or is soft and loose, or gumbo, and also how deeply it is plowed.

It may be stated in a broad, general way that the modern gas tractor of 30 horsepower will do the work of thirty fresh-to-the-minute draft horses at about one-third the expense and will cut down the hired help on the farm by two-thirds. It will break 20 to 40 acres a day, stubble plow 25 to 50, drill and harrow (simultaneously) 100 to 150, double-disk 60 to 75 harvest 10 to 120 acres of wheat and thresh 1,400 to 2,500 bushels of wheat running approximately 15 bushels to the acre.

Changing Systems

It must not be imagined that the change from horse to motor traction on the Graham farms was the simple affair of merely selling the animals and buying a motor to take their place. On the contrary, the 3 years of Ray Graham's management before the gas motor superseded the horse, were devoted to the preparation of the farm for the most economical use of motor

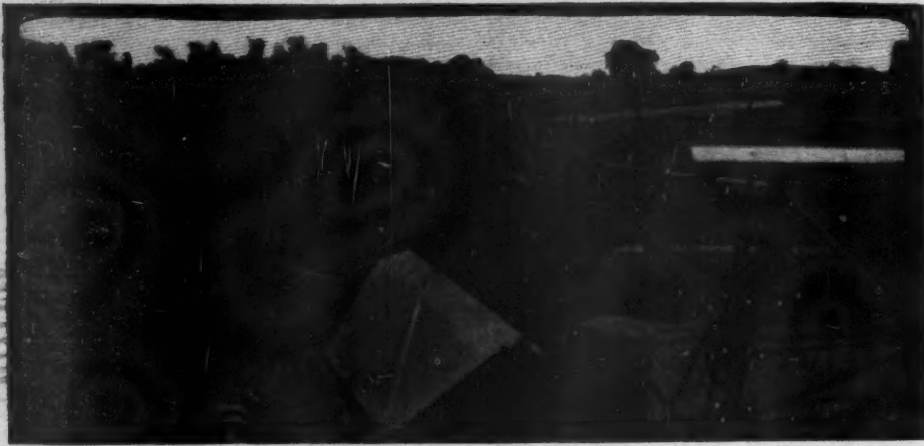


NOTICEABLE ABOVE ALL ELSE ABOUT
THE TRACTOR IS THE SIZE OF THE DRIVING
WHEELS WITH THEIR LONG SPURS

tractors. The many small fields into which the farms were divided had to be thrown together to make a few large fields, as obviously larger fields meant fewer turns and less time and effort lost in making them, resulting in more economical operation. The fields were originally cut up with open ditches which must needs be replaced with tile drains and the ground leveled off. Bridges and culverts had to be strengthened to withstand the weight



THE TRACTOR TAKES ITS FUEL SUPPLY TO
THE FIELD. THE PORTABLE TANK



EACH BINDER IS GUIDED BY A STEERING WHEEL LIKE A MOTOR CAR



RAY GRAHAM ON ONE OF THE DRAGGED ROADS THROUGH THE FARM

of the tractor. Roadways from one part of the farm to another were improved and dragged frequently until a hard surface was produced which would withstand as much as possible the wheels of the iron horse. Gasoline supply stations were erected at several points distant from headquarters in order that the fuel need not be hauled to the motor. These substations were succeeded by the gasoline tank wagon, shown in one of the illustrations, which the tractor hauled around with it when moving from one field to another. With this arrangement the tractor's base of supplies was never far from the scene of operations.

Graham An Agricultural Engineer

Ray Graham is not simply a farmer, he is an agricultural engineer and is a good example of what the agricultural schools are doing for the farmers of the middle west. When he entered the agricultural course in the University of Illinois it was with the one idea of equipping himself to make a dividend paying proposition out of a partially run-down farm. While the property was as profitable as any in the neighborhood under the old methods of farming, he believed that modern methods would result in more profits, and this belief was strengthened by the time he graduated.

Not alone in the matter of farm power

have improvements been introduced on the Graham farms. Scientific methods in the matter of soil fertilization and crop rotation, combined with intelligent seed selection and treatment, have increased the yield very much, which, with the more economic methods of cultivation and harvesting, have resulted in a very decided increase in the balance on the profit side of the ledger.

Tractors are not the only way in which gas power is used on these farms. A stationary gas engine supplies power for shelling corn, grinding feed and operating the machines in the shop, such as a grindstone, a small lathe and a drill press. In order to protect the engine from the dust and dirt it is installed in a small room by itself and belts through the partitions give connection to the various machines to be driven. The numerous wells which have been drilled about the farm by means of the tractor are supplied with pumps which are operated by very small gas engines.

Motors Pump Water

Some of the wells which are used only temporarily are so arranged that the tiny engine which pumps them can be moved from one to the other at will, the change requiring the services of two men for less than half an hour. The bathroom and kitchen in the manager's home are supplied with running water, which is pumped and stored under air pressure by a small gas engine. Arrangements are being made to light the house and offices electrically by means of a small gasoline driven generating set.

When a farmer working about thirty horses, as Graham was doing on his farms, can see that from half to two-thirds of his investment in horses will purchase an engine to do his work—an engine that is no expense when not in use, that costs less for gasoline than horses do for feed and requires no attention when idle—it does not take him long to decide to make the change. Farmers no longer meet the cartoonists' idea of green citizens, who wear a linen duster and carry a carpet bag on their visits to the city. From a simple, hardworking tiller of the soil the

farmer has become a broad-gauge man of affairs. Today the proprietor of a large farm is the head of a great enterprise involving a heavy investment of capital and an extensive employment of labor. His mail is brought daily to his door by rural mail carriers, and from the well-equipped office on his farm he is in telephonic communication with the cities. In his own way he is as much a captain of industry as the heads of larger interests and he is as keen in his appreciation of labor-saving devices. Consequently the work on the Graham farms is being watched with interest by the landowners in that part of the country as a practical example of the development of agricultural motors during the last decade.

Origin of the Gas Engine

The modern gas traction engine had its origin with the beginning of the present century. During the last 10 years of the nineteenth century the small stationary gasoline engine was in general use for many kinds of light work on the farm, but the farm tractor presented a much more complicated problem. When the motor car first made its appearance some 12 or 13 years ago a few saw in it more than a swift and luxurious vehicle—they saw that its real future lay in supplanting the horse on the farms of the world, and they at once set to work to develop it with that object in view. Its development was brought about by skilled mechanics who were also practical farmers and who therefore knew just what was required of a farm tractor which would do away with the disadvantages of horse traction.

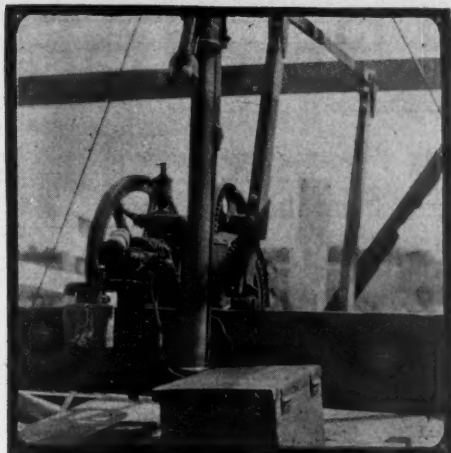
In the early motor car engine, crude as it was, they saw the solution of the prob-

COST OF PLOWING WITH TRACTOR

Plowing 20 acres of stubble per day to a depth of 8 to 12 inches:	
Gasoline, 50 gallons, at 10c per gallon	\$5.00
Oil, 4 gallons, at 30c per gallon	1.20
One engineer, at \$2.75 per day	2.75
One plow tender, \$2 per day	2.00
Interest on investment at 6%	.84
Depreciation and repairs, at 15%	2.20
Total cost for 20 acres	\$13.99
Cost per acre	.70



A GAS ENGINE SHELLS THE CORN, GRINDS THE FEED AND RUNS THE GRINDSTONE, LATHE AND THE OTHER SHOP TOOLS



WINDMILLS ARE OUT OF DATE WHERE GAS ENGINES PUMP WATER WHENEVER IT IS NEEDED FOR STOCK OR MOTORS

COST OF PLOWING WITH HORSES

Plowing 20 acres of stubble to a depth of 8 to 12 inches, assuming $2\frac{1}{2}$ acres per day per two-horse plow:

Sixteen horses, at \$1.50 per day..\$24.00
Eight men, at \$2 per day..... 16.00

Total cost for 20 acres.....\$40.00
Cost per acre..... 2.00
Difference in favor of tractor.. 1.30

lem of getting enough power without great weight. But the ordinary vehicle motor was found almost valueless for the farm tractor, as it would not cool or stand the strain of running on a low gear hour after hour; the bearings were small and the other parts too light. It was found early in the work that an entirely new motor must be designed—one that was strong enough to stand the heavy work and that had a surplus of power over and above that consumed in propelling the engine. The farm tractor motor in its development has closely followed that of the motor car motor, a single cylinder having first been used, then two cylinders and now four.

Engines Revolutionize Farming

These engines are revolutionizing farming in many parts of the world. They are breaking up the broad prairies of Canada at the rate of hundreds of acres a day. The wide cattle ranges of Montana are fast disappearing before the onward march of their high, wide wheels. They are plowing up bones on the old overland trail in Kansas and Colorado. The great wheat fields of Minnesota, North Dakota and South Dakota are dotted with them. Down in Texas, in the rice fields of Louisiana, in old Virginia, in sunny California—all over the United States—they are striding over the fields in their 7-league boots. They are traversing the African veldt with their strings of plows and harrows; they trudge tirelessly over the broad, rolling pampas of the Argentine; the bleak steppes of Russia and Siberia echo with the sharp rattle of their exhaust. Wherever there are broad prairies

to be reclaimed and turned into fertile fields, there these giant farm horses are at work, increasing the world's productive acreage and cutting the cost of raising the world's grain crops well nigh in two.

The greatest value of the modern gas tractor lies in its all-around serviceability. An engine which can be used to advantage only in doing one or two kinds of work, such as breaking and threshing, does not provide a profitable investment for the farmer, because he must also keep a large number of horses throughout the year with which to do the other kinds of work which the engine cannot do, and he therefore has his money tied up in the two investments. The modern gas tractor can do nearly everything horses can do, and do it better, more quickly and more cheaply—and can do many things that horses cannot do. It provides a portable power plant which enables the farmer almost entirely to do away with horses. With it he can not only do his breaking, plowing, disk-ing, harrowing, drilling, harvesting and threshing, but also many kinds of stationary work, such as sawing wood, pumping water, drilling wells, grinding feed, shell-ing corn, turning the churn, cream separator, grindstone and other machines.

Horses an Expense

To return to the cost of horse traction—at first glance it would seem that the figure of \$1.50 a day for the maintenance of a horse is rather high. In fact, it has even been stated that horses cost practically nothing to keep on the farm, because they consume nothing that is not raised there, but they cost just the market price of the feed on the farm. Then there is the expense connected with shoeing and similar equipment. The portion of the cost that is usually given the least consideration is that of the daily care that must be given. This is a labor that is very patent to the farmer's boy with the reminder several times daily that the chores must be done.

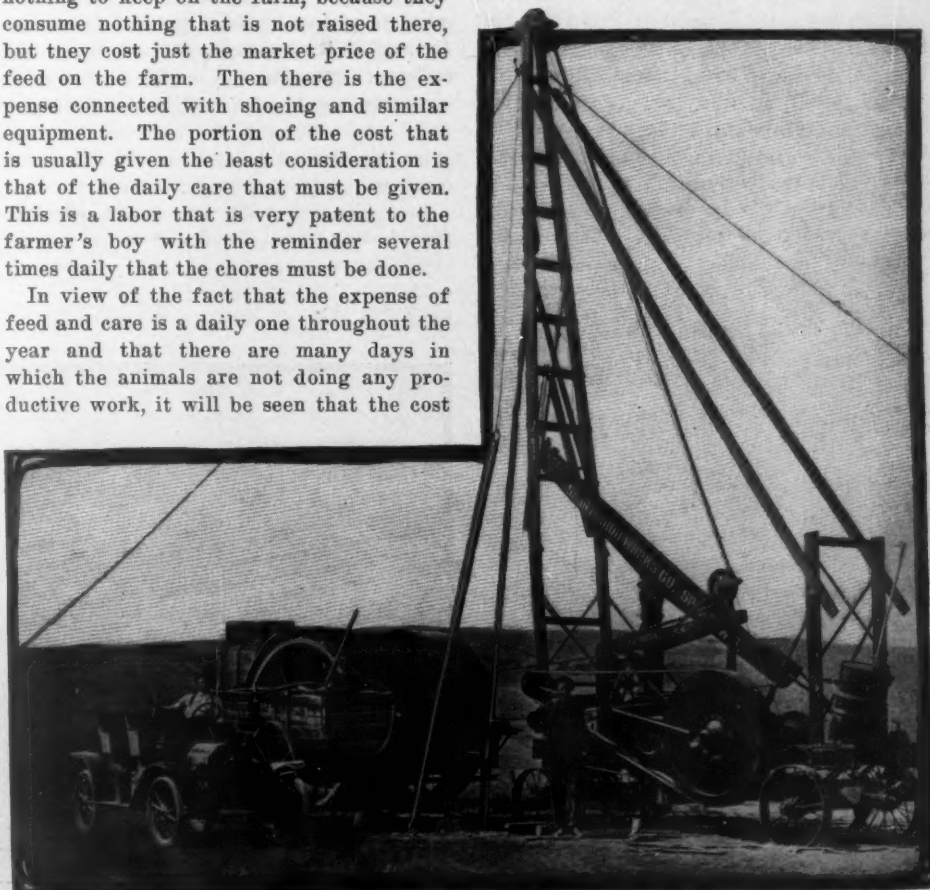
In view of the fact that the expense of feed and care is a daily one throughout the year and that there are many days in which the animals are not doing any productive work, it will be seen that the cost

of maintenance for each actual working day is higher than may be at first supposed. It would perhaps be ungracious to speak of the horse—man's faithful servant—as a burden, but in this highly competitive age mechanical progress renders the necessary agent of the industry of yesterday the burden of today.

Another figure that may seem excessive in some localities is that of \$2 as a day's wages for the farm hand such as would be found on a binder or plow. When men are hired on a daily wage basis and board themselves the rate falls but little below this, and when board is supplied careful bookkeeping will show that the smaller wages are made up by the cost of board and other concessions usually granted the hands.

Implements Limited by Horses

It is a remarkable fact that with all the world's advancement in industrial methods it was not until the last decade that an improvement was devised in farm traction power. Farm implements themselves were invented and improved—the self-binder, the gang plow, the drill—but the practical value and utility of each was necessarily limited by the limitations of the power used to pull it. Ever since it was invented each of these machines has been capable of doing a great deal more work than horses could get out of it. The development of the modern gasoline farm tractor enormously increases the value of every implement drawn by horses by getting so much more work out of it.



THE TRACTOR DRILLS THE WELLS THAT ARE LATER TO SUPPLY IT WITH WATER

National Victor in Bakersfield Road Race

Herrick Drives the Winner in Free-For-All in Kane County Merchants' Association Road Meet, Averaging 53.6 Miles Per Hour Over a Sensational Course and Defeating Bert Dingley in Pope-Hartford—Seifert In a Mercer, Third

Louis Nikrent in Buick Captures Light-Car Race, Beating Chalmers

BAKERSFIELD, Cal., July 4—Special telegram—Harvey Herrick, driving a 40-horsepower National, captured the Bakersfield road race run today under the auspices of the Kern County Merchants' Association, covering the 160 miles in 2 hours 58 minutes 58½ seconds. Bert Dingley, driving a Pope-Hartford, took second place. Time, 3:01:58 for twelve laps.

The race was one of the most sensational ever held in California, not on account of the speed made, but as a result of the unusual character of the course. Every kind of road condition was encountered by the drivers. Part of the course was up a steep grade. The motor enthusiasts put the famous China grade, one of the most difficult hills in this part of the state, in shape for the cars to race over and as a result this part of the course proved a spectacular point for the motorists.

Nikrent a Winner

By winning the free-for-all Herrick wins \$2,000 cash and the Levis trophy. The light-car race was won by Louis Nikrent in a Buick, in 2:15:34½.

These races were the first ever held in this part of the state and judging from the attendance and enthusiasm of the spectators, the event will become an annual event very probably. Summary:

Light car race, 100.35 miles—Louis Nikrent, Buick, won; time, 2:15:34½. G. L. Weathers, Chalmers, second; time, 2:19:44½. Glen Packard, Ford, third; time, 2:44:42½. Haynes, Buick, Mercer and Franklin, did not finish.

Free-for-all, 156.1 miles—Harvey Herrick, National, won; time, 2:58:58½. Bert Dingley, Pope-Hartford, second; time, 3:01:58 for twelve laps. Frank Seifert, Mercer, third; time, 3:16:15 for seven laps. Buick car did not finish.

This was the debut of Bakersfield as a racing center and the people of the oil center took the greatest interest in the initial event. Five thousand dollars was raised by a committee headed by W. E. Drury and in addition to cash prizes trophies were awarded to the winners.

The course is 10 miles to the lap and on account of its location, being overlooked by a natural amphitheater, spectators could see the cars as they dashed around for almost the entire distance. The course was peculiar for a race of this kind as there was a decided grade, China grade, to climb. At the top there was a sharp turn and at this point there were many narrow escapes. Three weeks before the race the course was in very bad shape, but much work was done and, while it was not a

boulevard at the start of the grind, it was much improved.

Soon after the cars started on their wild dash the course became cut up in places and was more or less rough. The best speed was made along a 2-mile stretch near the natural grand stand. The list of entries announced July 1 was as follows:

FREE-FOR-ALL—150 MILES

Car	Driver	Piston displacement cubic inches
Pope-Hartford	Floyd Purdy	389
Comet	Harvey Kennedy	405
Mercer	Frank Seifert	300.7
National	Harvey Herrick	448.8
Pennsylvania	Earl P. Cooper	558.15
Marquette-Buick	Louis Nikrent	298.5
Buick	J. J. Jeffries	298.5

LIGHT CAR RACE, 111.5 MILES

Ford	Flenn Packer	176.7
Franklin	Harry Buckley	107
Buick	Louis Nikrent	298.5
Haynes	D. Dubois Phillips	283.6
Buick	J. J. Jeffries	298.5
Chalmers	G. L. Weathers	300
Mercer	Frank Seifert	300
Pullman	Paul Schoonever
Hupmobile

Bakersfield has been race mad for more than a week. As the city is 150 miles from Los Angeles and 340 from San Francisco, it has been necessary for the different entrants to move their entire camps to the oil city. With the workouts daily and the big racing cars dashing over the streets in and out of the town much enthusiasm was developed.

Bert Dingley with the Santa Monica Portola-Vanderbilt Pope and Harvey Herrick with a National 40, similar to that with which Wilcox established a new mile record at Florida, ruled as favorites in the

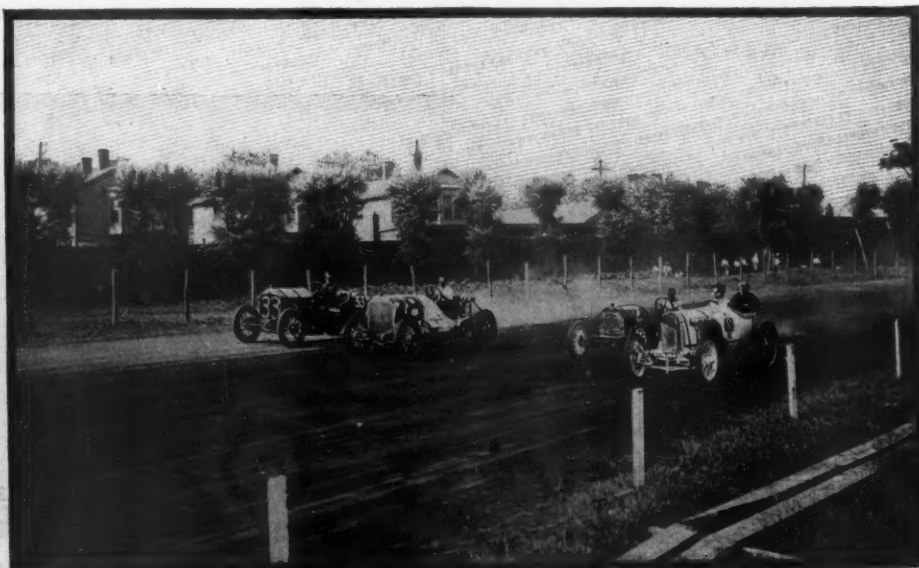
free-for-all. These two made the fastest laps in the tryouts.

The majority of the Los Angeles people who attended the race left Los Angeles Monday morning. Many machines were on the road and a pleasant day's run was enjoyed. The route leads over the mountains, through the San Franciscuite canyon and thence over a stretch of desert country for twenty miles. There are more mountains with the Tejon canyon as an outlet and then thirty miles more of burning sands into Bakersfield. The weather was somewhat like the hot spells of which Californians read of in the newspapers.

BURMAN BREAKS MILE RECORD

New York, July 5—The feature of the 2-day track meet at Brighton Beach which attracted the Moross string was the smashing of the 1-mile dirt track record by Bob Burman in the Blitzen Benz. This was accomplished this afternoon when Burman, with a flying start, made the circle in :48.72, which just shaded the old mark of :48.92, made by Ralph de Palma in the Fiat at Syracuse, N. Y., last fall.

Burman also did well in the racing line today, winning two heats of a 3-mile race, for the Remy brassard, his best time being 2:37.38. The first heat was run yesterday, Knipper winning it. Zengel, driving a National, won the 10-mile race for the 600 and under class and took an Australian pursuit race which went 24 miles. Louis



FLYING START OF REMY BRASSARD RACE MONDAY

Disbrow, driving a Pope-Hartford, won the 50-mile race. He stopped four times for tire troubles, too. Patschke in a Benz, Tyron in a Correja and Tower in an E-M-F, won the other races, each a 5-mile event for non-stock cars.

The long distance race yesterday was to have been of 1 hour's duration but was changed to 60 miles. This was won by de Palma in a Simplex, who defeated Hughes in a Mercer, his time being 59:21.37. All the events were nonstock and were at 5 miles each, save the long race. The 161-230 class was won by Tower in an E-M-F, with Ferguson in a Lancia second and Craig in a Paige-Detroit, third, the time being 5:43.86. The 231-300 class went to Hughes in a Mercer, who beat Foster in a Correja and Juhasz in a S. P. O. in 4:55.51. The 301-450 class was won by Patschke in the Prince Henry Benz, with Sheets in a National second and Cobe in a Jackson third, the time being 4:42.47. De Palma in a Simplex won the 600 and under class, with Zengel in a National second and Sheets in a National third, the time being 4:45.93.

The novelty race was won by Lane in a Hudson. The free-for-all handicap went to Hughes in the Mercer with Lund in a Simplex second and Disbrow in a Pope third; time, 5:33.53. In the 1-mile time trials Burman went in :49.59 and :49.36.

In the practice Monday E. H. Frey, a Mercer driver, was killed when he crashed in a fence. Fred Robinson, another driver, was killed Saturday, his S. P. O. smashing into an oil wagon which was on the track.

MITCHELL'S COAST PICNIC

San Francisco, Cal., June 30—Californians, who never overlook a chance to prove their claim that they do things with more red-blooded energy than does the effete east, have just hit upon another pleasure idea which bids fair to become popular the country over. The new plan is for owners of cars of a certain manufacture to have a day's tour and a picnic all to themselves and the results are very gratifying. The largest of these so far was held when a Mitchell picnic was inaugurated by Mitchell car owners living in the vicinity of Sacramento. Headed by W. I. Elliott, manager of the local agency, forty-one Mitchell cars left the rendezvous in front of Hotel Sacramento early in the morning and headed for the Woodbridge picnic grounds over 30 miles away. They were joined at the grounds by cars from Stockton and other neighboring towns, bringing the total number of cars up to well over half a hundred, the average number of occupants in each car being four.

ENFORCING BAY STATE LAWS

Boston, Mass., July 1—Since the decision of the Massachusetts supreme court was handed down relative to speeding and the operation of traps, the Boston police have dropped the traps which they have been in the habit of maintaining in various places, but have turned their attention to other infractions of the



CARS PARKED NEAR GRAND STAND AT BRIGHTON BEACH

motor law, and now policemen are stationed in various sections where they take the numbers of cars whose drivers fail to blow their horns at intersecting ways, or where too much smoke escapes or the muffler cut out is used in the city limits. While the number of arrests for these causes do not begin to approach that of the speeding, yet if the police continue their activity it will soon bring the fines up again to where they were before. Police Commissioner O'Meara goes on the plan that everyone must obey the law, and instead of trying to ameliorate conditions he tells people who complain that their remedy lies with the legislature, where they should petition to have laws changed which do not meet public approval, rather than have the police department wink at evasion.

THE DIRT TRACK PROBLEM

New York, July 1—One very important subject which will be given most careful consideration at the general meeting of the Manufacturers' Contest Association to be held in August, will be the question of racing upon circular dirt tracks. All over the country there are in existence 1-mile circular dirt tracks built for horse racing. The popularity of the motor car and of motor car competitions has prompted county and state fair organizations to feature motor car racing among the headliners of the big days. In addition to this, racing events on circular dirt tracks are being advertised by individual promoters who have in mind the possibility of a considerable financial return in the way of gate money.

At a meeting of the active rules committee held in Detroit on June 19 it was the consensus of opinion that decisive action should be had at the August meeting for the restriction of circular track racing. Whether racing of this kind upon mile dirt tracks should be legislated against by the governing body, or whether sanction for circular track events should be granted

only after an entire reconstruction of the track surface and surroundings and some adequate provision other than the use of water has been made for laying dust, are open questions. In any case, the situation requires decisive action.

MEET AT KANSAS CITY

Kansas City, July 4—Special telegram—Eighty-five hundred people were in attendance today when the first event of the Elm ridge race meet was run. Only two slight accidents marred the day. Jack McLean, driving a Velie 40, threw a tire and went into the fence. He was not injured, although the car turned over completely. While trying to avoid the official Halliday car, which went to the scene of the first accident, Fred Robillard, in a Staver-Chicago, ran into the fence. He was not injured.

Teddy Tetzlaff, in a Lozier, failed to lower the track record of 52% seconds, his best time being 1:00:66. Summaries:

Ten-mile nonstock, class C 231 to 300 class—Ed Raimey, Cino, won; time, 10:33. Pearce, Falcar, second; time, 10:44. Monckmeier, Staver-Chicago, third; time, 11:05.

Five-mile race for private owners, invitation, race for R. H. Collins cup—Jack McLean, Velie, won; time, 5:38. Ed Potts, Cole, second; time, 6:07.


Ten-mile free-for-all, no restrictions, for board of trade cup—Ralph Ireland, Inter-State, won; time, 10:52. Pearce, Falcar, second; time, 10:54. Raimey, Cino, third; time, 11:02.

Fifty-mile, free-for-all, no restrictions—Ralph Ireland, Inter-State, won; time, 56:50. Pearce, Falcar, second; time, 56:53. National, third; time, 58:53.

PRINCE HENRY TOUR STARTS

New York, July 5—An Associated Press cablegram from Homberg, Germany, says thirty-seven German and twenty-eight English participants started today on the annual Prince Henry endurance tour. Prince Henry is taking part. The course for this year's tour starts at Homberg and follows a devious way through Germany to Hamburg. At that port the cars entered in the tour will be shipped to Southampton, England. There they will again take to the road, proceeding to Edinburgh and returning to London.

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The Valve Discussion



IS THE poppet valve going to take a tumble? This is the question that many people are asking at the present time. This question is being asked because people are wondering what is going to be the outcome of the sleeve valve and also the rotary valve. On other pages of this issue are descriptions of two 1912 models, by American manufacturers, one of the manufacturers having entirely discarded the poppet valve and adopted the Knight sleeve valve exclusively. The other manufacturer has adopted the Knight sleeve valve on one motor and retained the poppet on another. Throughout the entire country there is at present a wave of discussion on the merits of the different types of valves. This discussion has been going on for 3 or 4 years in Europe, it dating from the time when the Daimler concern adopted the Knight type of valve. Since then the battle has waged with varying degrees of fervor on the other side of the Atlantic, and it is certain that it will continue for some time at least. In America the opening shot is just being fired, and at present it is questionable if anyone can foresee the final result.

TODAY nobody knows whether in 10 years the poppet valve will be a matter of history or whether at that time the sleeve valve will be the leader, or whether the rotary valve will lead. One thing is certain, however, that the valve which is most durable and gives the greatest efficiency should have the greatest following at that time. Who knows but that the two-cycle motor may have usurped the field entirely before 10 years have passed?

THOSE who pin their faith to the slide-valve motor do so for many reason, chief of which is that with this motor there is a definite opening and closing of the intake and exhaust ports, no matter at what motor speeds the car may be operating. Two years ago one of the leading American engineers experimented with poppet valves at high motor speeds and discovered that frequently at the high speeds the exhaust valves did not seat, there not being sufficient time owing to the inability of the valve spring to close the valve in the interval before a cam returned to open it again. With such a condition it is certain that the most powerful mixture was not obtained. With either the sleeve or rotary valve such failure of operation cannot be, because no matter how fast the motor is operating there is a definite opening and closing for both intake and exhaust valve. For this reason it is certain that the rotary or sleeve valve will play an important part until something better has been brought out.

THE devotees of the slide-sleeve valve and also those of the rotary valve have properly taken hold of the argument that the trouble of valves getting out of proper timing is practically eliminated. It is a well-known fact that with poppet valves the tension of the springs varies on the exhaust side after 5 or 6 weeks' use, and consequently the accuracy of opening and closing is interfered with. Carbon gets on the valve seatings and prevents proper closing of the valve with the result that the compression

is interfered with, and the face of the valve injured. These troubles are, as far as can be learned, obviated in the sleeve or rotary types of valves. With these positively-operating valves it is a fact that they will not operate unless they are right, and when right they go on without trouble, and, in fact, frequently get better after a certain amount of usage. This will be greatly appreciated by car owners.

MOTOR AGE does not believe that the time will come when any one form of motor will crowd the others out of existence. There is room for all, and all will continue to be manufactured, will continue to be sold, and will continue in popularity with the people. The makers of poppet valves are improving their products, they are studying the finer points of design, and they are getting much more power out of their motors than ever before. The rotary valve makers will develop their product, the disk valve following will develop its, the sleeve valve devotees will develop theirs, and all will continue with more or less following until it has been developed which is best.

The Progress of Control



MAN has two hands, a right and a left, and being born with such it is natural to infer that they were intended for use. One being as large as the other it is a common inference that it was intended that they should share their duties as nearly equal as possible. Many designers of cars have apparently not realized this in the past, and have placed practically all the work of driving a car on the right hand. They put the steering wheel on the right because European makers did it, whereas, according to the road laws of America it should be on the left. These manufacturers put the emergency brake lever and the change speed lever on the right so as to be operated with the right hand. Undoubtedly they would have put more levers there had they been needed. Not a few of the makers put the spark and throttle control levers on the right half of the steering wheel in order to operate them with the right hand.

FORTUNATELY, today, the makers are realizing that the left hand also is useful. Not a few of them who keep the steering wheel on the right are putting the change speed and emergency brake levers in the center of the car. This is a good policy. It protects these levers and makes it more convenient to use a fore door body. It gives the driver more room in that he is not cramped as is ordinarily the case where these two levers are placed between his right leg and the body. But it is simpler to manufacture a car with these levers in the center of the floor board and besides being cheaper it improves the appearance of the car. Operating them with the left hand is a little awkward for the first half day, but after that the difference is forgotten. Operating these levers with the left hand leaves the right hand free to control the steering wheel, which is very necessary in driving. With the two control levers in the center of the car entrance from the right side is easy for the driver, and eliminates the necessity of walking around to the left, as is imperative where the levers are located on the right side of the car.

Exports and Imports for Month of May

WASHINGTON, D. C., July 1—Exports of motor cars and parts continue to grow at an amazing rate. During May, according to the latest government returns, the number of cars shipped abroad was 1,466, valued at \$1,513,547, together with parts, not including tires, to the value of \$343,879. In May a year ago the number of cars exported was 1,075, valued at \$1,491,497, while the parts exports were valued at \$208,603. During the 11 months' period the exports of cars increased from 5,942, valued at \$7,910,379, in 1910, to 10,249 cars, valued at \$11,262,177, in 1911. The exports of parts likewise increased in value from \$1,385,036 to \$2,219,294 during the same period.

The detailed shipments for the periods under consideration were as follows:

May	
Exported to—	1910. 1911.
United Kingdom	\$ 487,267 \$ 203,539
France	101,549 71,922
Germany	72,442 19,972
Italy	29,633 22,125
Other Europe	173,802 89,554
Canada	664,406 1,107,105
Mexico	45,262 11,990
West Indies and Bermuda.	12,166 27,436
South America	21,438 104,172
British Oceania	12,243 109,813
Asia and other Oceania...	64,455 61,756
Other countries	15,437 28,042
Eleven months ending May—	
Exported to—	1910. 1911.
United Kingdom	\$2,038,843 \$2,066,297
France	584,404 494,173
Germany	227,235 231,743
Italy	319,451 196,524
Other Europe	420,889 646,732
Canada	3,721,862 5,912,794
Mexico	501,219 608,805
West Indies and Bermuda.	406,553 370,869
South America	296,558 792,093
British Oceania	319,555 1,146,402
Asia and other Oceania..	310,198 733,769
Other countries	148,648 281,270

While the export trade is growing with every succeeding month, the import trade in motor cars is dwindling. In May seventy-five cars, valued at \$158,046, were imported, together with \$47,846 worth of parts, while in May a year ago the number of imported machines was eighty-three, valued at \$173,344, with parts valued at \$78,305. During the 11 months' period the number of cars imported decreased from 1,359, valued at \$2,618,217, in 1910, to 771 machines, valued at \$1,642,329, in 1911. The imports of parts took a tremendous drop during this period, the statistics showing the decline in value to be from \$910,069, in 1910, to \$336,168, in 1911.

During May, last, cars were imported from the following countries: United Kingdom, nineteen, valued at \$36,941; France, twenty-six, valued at \$62,442; Germany, thirteen, valued at \$26,460; Italy, seven, valued at \$12,799; other countries, ten, valued at \$19,404.

GLOOMY OUTLOOK IN ITALY

Milan, June 21—Nineteen hundred and ten was not a brilliant business year for the Italian motor industry. While most all other car manufacturing countries show up with very appreciable increase in their foreign trade here in the land of Fiat and



July 4-20—Prince Henry tour, Germany.
July 14—Reliability run for trucks of Quaker City Motor Club, Philadelphia.

July 15—Guttenberg track race, Henry Shaffer, promoter.

July 15-17—St. Louis reliability run, Missouri Automobile Association.

*July 17-22—Milwaukee reliability run, Wisconsin State Automobile Association.

July 17-22—Cleveland reliability run, Cleveland News, Cleveland, O.

*July 20-23—Minneapolis reliability run to Helena, Mont., Minnesota State Automobile Association.

July 21-22—Brighton Beach 24-hour race, E. A. Moross, promoter.

July 25—French grand prix road races.

*August 3-4-5—Galveston Beach races, Galveston Automobile Club.

August 10-12-13—Races on Gearhart beach, Portland Automobile Club, Portland, Ore.

August 12—Worcester hill-climb, Worcester Auto Club.

August 12—Reliability run of Quaker City Motor Club, Philadelphia.

August 17—St. Louis reliability run, Missouri Automobile Association.

August 25-26—Elgin road races, Chicago Motor Club.

September —Glidden reciprocity run.

September 1—Oklahoma reliability run, Daily Oklahoman.

September 2-4—Brighton Beach races, New York.

September 2-4—Speedway races, Indianapolis motor speedway.

September 4—Denver track meet, Denver Motor Club.

September 7-8—Philadelphia track meet, Philadelphia Automobile Trade Association.

September 7-8-9—Track meet, Minnesota State Automobile Association, Hamline track, Minnesota.

September 18-20—Reliability run for trucks of Chicago Motor Club, Chicago.

October 7—Fairmount Park road race, Philadelphia.

October 9-13—1,000-mile reliability, Chicago Motor Club.

September 12-13—Track meet, State Automobile Association, Grand Rapids, Mich.

September 15—Track meet, Appalachian exposition, Knoxville, Tenn.

September 16—Track meet, Automobile Club and Dealers, Syracuse, N. Y.

September 23—Road race, Lowell, Mass., Lowell Automobile Club.

October 3-7—Track meet, Danbury, Conn., Agricultural Society.

October 16-18—Reliability run of Harrisburg Motor Club.

November 1—Track meet of Waco Automobile Club, Waco, Tex.

November 2-3-4—Reliability run of Quaker City Motor Club, Philadelphia.

November 9-11—Track meet, San Antonio Automobile Club.

November 7-10—Phoenix road race, Maricopa Automobile Club.

November 10—Track meet of Maricopa Automobile Club, Phoenix, Ariz.

November 27—Vanderbilt road race, Savannah, Ga.

November 30—Grand prix race, Savannah, Ga.

November 30-December 2-3—Los Angeles motordrome.

December 25-26—Los Angeles motordrome meet.

January 6-20—Madison Square. Garden show, New York City, Automobile Board of trade.

March 13-20—Show of Boston Commercial Motor Vehicle Dealers' Association, Mechanics' building, Boston.

January 1-7—Grand Central palace show of Automobile Manufacturers of America, New York City.

* Sanction already issued

Italy just the opposite has happened and the outlook is far from being rosy for the present year.

All told, 2,120 passenger cars or touring cars were exported in 1910, which is only thirty-eight fewer than in 1909. However, in value the difference is very large, as the 1910 exports of these cars is estimated at being worth \$4,161,214, while the balance for 1909 shows a value of \$4,588,287, a difference of \$427,073 in cash on the one hand and of only thirty-eight cars on the other. In 1908, when only 1,629 cars were exported, their value totaled \$5,647,349.

Based upon the average price, the Italian pleasure motor car exported in 1908 was worth \$3,466, the one exported in 1909 was worth \$2,126, while the 1910 car was worth only \$1,962.

The one satisfaction for the Italian manufacturer is to see that his export business in commercial vehicles is increasing. Last year's exports showed up with a total value of \$374,700, while those of 1909 totaled only \$220,200 and those of 1908 only \$85,626.

Great Britain still continues to be the best customer the Italians have and the only country in Europe which has been steadily increasing its purchases of the Italian products. Last year the English people bought 813 passenger cars, or 103 more than in 1909 and 425 more than in 1908. France bought 187, as against 177 in 1909 and 275 in 1908. Germany took only seventy-one cars, while in 1909 150 went there and 156 in 1908. Outside of Europe, Argentina Republic is the largest buyer, having received 199 in 1910.

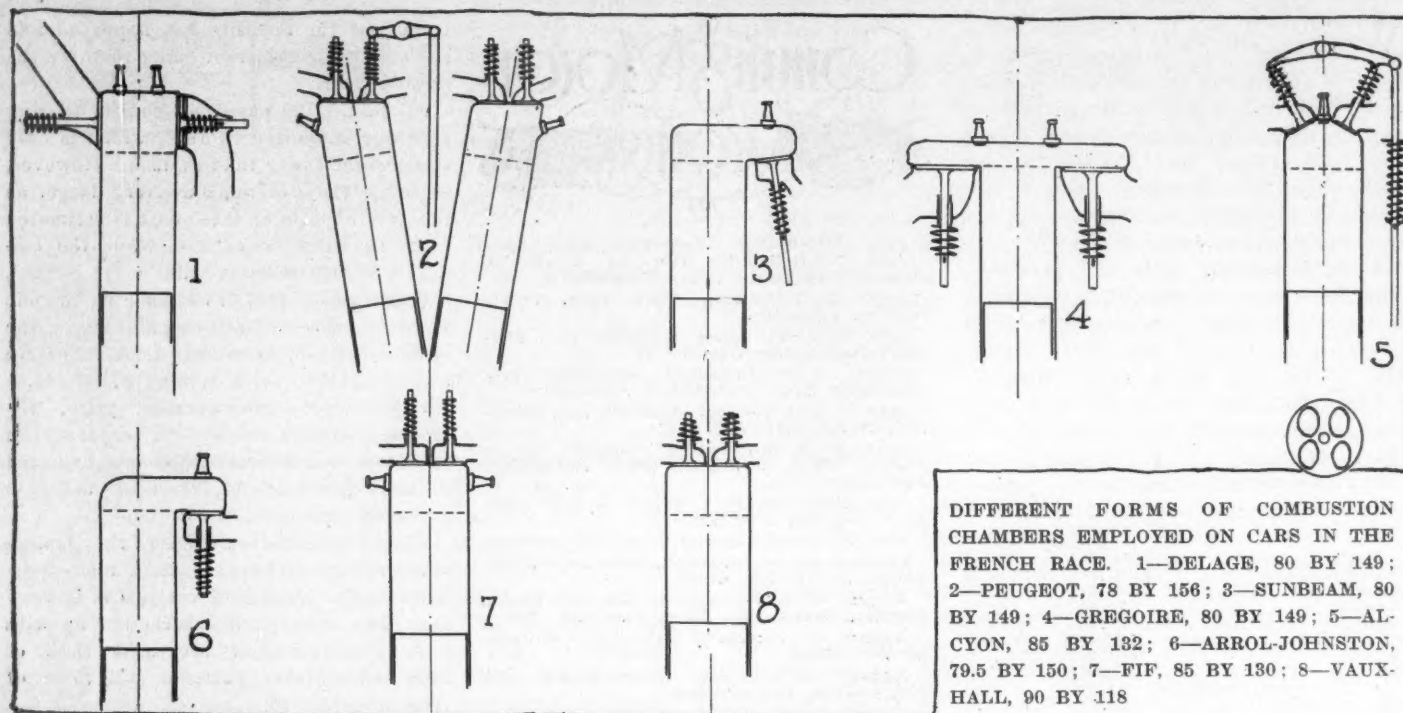
The exports to the United States took a big drop last year. Only 181 cars are shown to have gone to Uncle Sam, as compared with 317 in 1909 and 153 in 1908.

The government records show that 398 passenger cars were brought into Italy in 1910, as compared with 327 in 1909 and 348 in 1908. The value of the imports of last year is \$916,028, while the 328 cars imported in 1909 were worth only \$782,508 and the 348 brought in in 1908 \$870,894. On the basis of the average price the 1910 car was worth \$2,301, the 1909 car \$2,393 and the 1908 car \$2,502.

The importation of commercial vehicles shows a little decrease, the 1910 imports totaling \$144,787, while those of 1909 amounted to \$146,050. In 1908 only \$74,350 worth of these vehicles were imported.

The majority of the passenger cars imported by the Italians come from France. Last year 228 were imported from that country, or four more than in 1909 and twelve less than in 1908. From Germany seventy-six cars were imported, or fifteen more than in 1909 and thirty-four more than in 1908. Only two cars are recorded to have been imported from the United States in 1910.

Aftermath of French Light-Car Race



DIFFERENT FORMS OF COMBUSTION CHAMBERS EMPLOYED ON CARS IN THE FRENCH RACE. 1—DELAGE, 80 BY 149; 2—PEUGEOT, 78 BY 156; 3—SUNBEAM, 80 BY 149; 4—GREGOIRE, 80 BY 149; 5—ALCYON, 85 BY 132; 6—ARROL-JOHNSTON, 79.5 BY 150; 7—FIF, 85 BY 130; 8—VAUXHALL, 90 BY 118

PARIS, June 27—So great is the enthusiasm of the French over the results of the light-car road race at Boulogne, which resulted in the victory of Bablot in a Delage, as reported fully by cable in the June 29 issue of Motor Age, that it already has been decided that a second light-car race shall be run next year on the Boulogne course, the rules to remain the same for the motor, with a weight limit of 1,984 pounds and no stipulations as regards mudguards and running boards. Delage announces that he will be among the starters. A number of the light cars will also be seen in the grand prix on the Sarthe course on Sunday, July 25, the organizers of this race having decided to create a special class for this type of car. Lion-Peugeot, Alcyon and Gregoire are almost certain starters.

With a four-cylinder motor of a fraction more than 3 inches bore and running more than 17 miles to the gallon, Bablot won the light-car race in a Delage at an average speed of 55 miles an hour. The winner took fourth place in the first of the twelve rounds, having ahead of him Boillot in the Lion-Peugeot, Burgess in the English Calthorpe and Goux in a Lion-Peugeot. On the next round Bablot was second, and in this position the Delage driver had to remain until the end of the sixth round. Then, after being literally on the heels of his rival for 190 miles—for the two had started at an interval of less than 3 minutes—he shot ahead and for 200 miles was hard chased by Boillot's Lion-Peugeot.

For the whole distance of 387.6 miles Bablot only stopped his car once to take on gasoline and oil. His motor never was stopped, the bonnet never was lifted, not

RESULTS AT BOULOGNE

Driver	Car	Time
1—Bablot,	Delage.....	7:02:41
2—Boillot,	Lion-Peugeot.....	7:03:52
3—Thomas,	Delage.....	7:04:17
4—Guyot—	Delage.....	7:05:18
5—Porporato,	Gregoire.....	7:23:29
6—Burgess,	Calthorpe.....	7:39:00
7—Reid,	Arrol-Johnston.....	7:39:37
8—De Resta,	Arrol-Johnston.....	7:45:29
9—De Marne,	Gregoire.....	7:57:19
10—De Vere,	Cote.....	7:59:29
11—Hodge,	Arrol-Johnston.....	8:17:11
12—Woelmont,	Excelsior.....	8:20:24
13—Mathis,	Mathis.....	8:30:55

a drop of water was added to the radiator and the Michelin tires stood the strain so well that there never was any need to change a wheel. Against the advice of

Louis Delage, Bablot had started the race with only half the quantity of gasoline and oil necessary to finish the distance. Filling up at half time cost him 3½ minutes, and it is very doubtful if he gained anything by reason of his lightness.

Hard Fight for First

When the twelfth and last round was commenced Bablot had an advantage of 1 minute 24 seconds on the Lion-Peugeot. As they had started respectively fourth and tenth, however, he was behind the second car in road position and was due to come into the stands within 3 minutes of the Lion-Peugeot in order to capture the trophy. Boillot, making a desperate effort to get a little more speed out of his car,



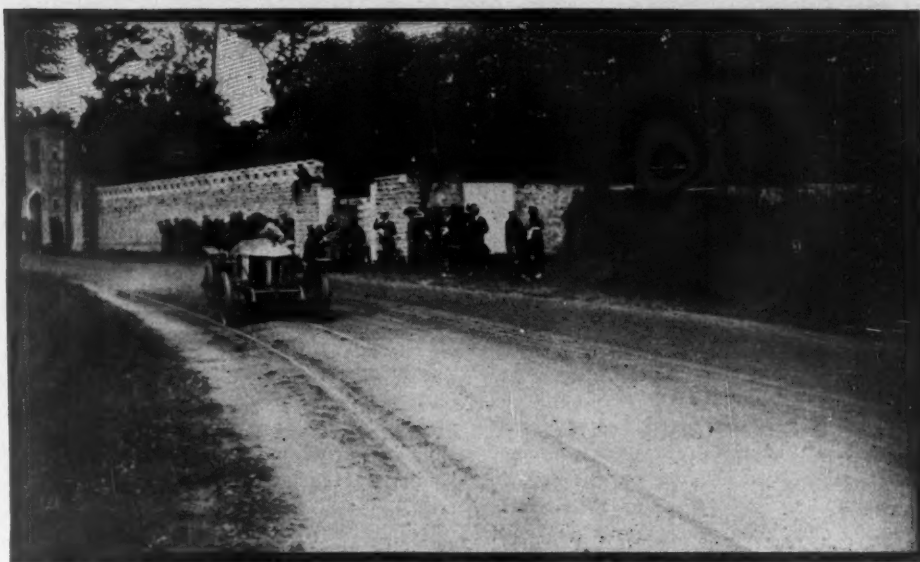
BOILLOT IN PEUGEOT, PASSING THROUGH A TOWN

rushed past the winning line and waited in fear and hope that his rival's V-shaped bonnet would not appear around the bend within the time limit. Bablot also was speeding over the course with a car which held to the road in a manner recalling Leon Thery's Brazier. Six miles from home a back rear tire fizzled out. To stop would have meant the loss of the race; to run on the rim might cause a breakage. Bablot took the latter chance. At over 70 miles an hour on the straightaway, down the hill through Bainetun, over the rough pavé of the village, swinging around the sharp turn on the outskirts of the hamlet, then up the 12 per cent grade and along the winding descending road to the grandstands, he roared without a slackening of speed, and was rewarded by winning the race with a margin of 1 minute 11 seconds. Five minutes later the Rudge-Whitworth wheel with the punctured tire had been replaced by a sound one and the car was fit for another 400 miles run.

Regularity Cup to Delage

In addition to getting the first prize, Delage won the regularity cup, for Thomas, the Antoinette aeroplaneist, came in third, 25 seconds behind Boillot's Lion-Peugeot, and Guyot was fourth, 1 minute behind his team mate. The firm lost one car, that driven by Rigal, who had been running fourth in the third, fourth and fifth rounds and in fifth position until the end of the ninth. Then a spring band holding a screw on the double universal joint housing slipped out of its groove, allowed the housing to work loose and finally disconnect itself entirely. Rigal came to the grandstands and stopped to hand over to Engineer Delage the half ounce of metal which had been his undoing. It is unique in European racing for any one firm to obtain such a complete victory as that scored by Delage in an important and really keenly contested event.

The careful way in which Louis Delage prepared his cars and looked after every detail in connection with the training of



BABLOT IN DELAGE ON HIS LAST LAP

his men is responsible in a very large measure for his well-earned success. Although the chassis was practically a standard model, the motor had been specially prepared, without, however, having anything freakish in its design. Delage had preferred to place the valves on opposite sides of the motor and horizontally in the top of the combustion chamber. The intake valve stems passed through the intake manifold, the entire valve being swept by the cool gases. The exhaust, on the opposite side, was directed upwards, away from the valve spring, and although the valve stem was horizontal, the exhaust gases went out at an angle of practically 45 degrees to the valve stem. The combustion

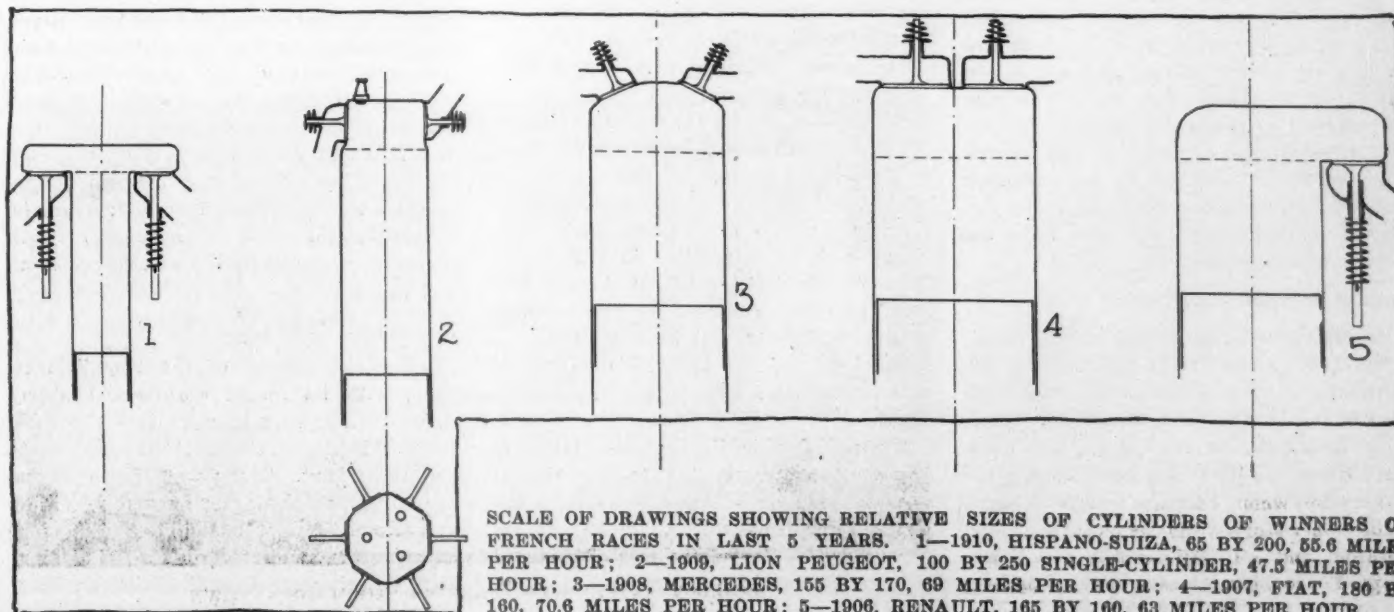
chamber was hemispheric, with two spark plugs mounted in the head and fired from one Bosch magneto. A second magneto was carried in the tool chest to be used in case of a breakdown. With the cylinder cast in pairs Delage preferred to carry his crankshaft on five ball bearings, and also had his camshafts running on ball bearings.

Chrome Nickel Steel Used

Practically all the essential parts of the motor were made of B. N. D. steel from the Derihon factory. It is a chrome nickel steel offering a resistance of 150 to 180 kilogrammes per square millimeter. With this steel Delage was able to produce

RESULTS OF PREVIOUS FRENCH ROAD RACES

Year	Race	Winner	Car	Bore	Stroke	M.P.H.
1911	Light car race	Boillot	Delage	3.15	5.87	54.9
1910	Volturette race	Zuccarelli	Hispano-Suiza	2.56	7.87	55.6
1909	Voiturette race	Gluppone	Lion-Peugeot single	3.94	9.83	47.5
1908	Grand Prix	Lautenschlager	Mercedes	6.10	6.69	69
1907	Grand Prix	Nazzaro	Fiat	7.09	6.30	70.5
1906	Grand Prix	Slaz	Renault	6.50	5.91	63
1905	Gordon Bennett	Thery	Brasier	49



connecting rods weighing exactly .465 pounds each. Steel had been employed at first for the pistons, but these were later changed for a set made of very fine grade cast iron. The drivers, Bablot, Thomas, Guyot and Rigal, were equal to any four to be found in Europe, and had the advantage of being well seconded by the factory during the training period. The cars were equipped with five speeds when the tests were begun, the fifth speed being geared up for the long straightaway downgrades to be found on one leg of the course, and the other speeds carefully proportioned for the hilly, winding roads on other parts of the course. It was found, however, that better results could be obtained with four speeds, direct drive being on the fourth. In consequence all the gearsets were changed. The chassis features followed standard practice, the cars being fitted with distance rods having a slight downward push on the rear axle and provided with universal joints to prevent any breaking effect on the springs. The cars held to the road in a remarkable manner; even at the highest speeds they ran as if on rails, and were a striking contrast to the Calthorpes, which, when all out, wriggled and skidded in an alarming manner.

Showing of the English

Apart from the duel between Bablot's Delage and Boillot's Lion-Peugeot, there was plenty of interest in the race. The Englishmen looked dangerous at the outset, for on the initial round Burgess, with his Calthorpe, secured second position only 31 seconds slower than Boillot's Lion-Peugeot. Hancock's Vauxhall, a magnificently prepared car, with much about its racing equipment recalling Brooklands practice, went out on this round with a broken piston head. The Arrol-Johnston cars showed regularity by finishing with only a few seconds difference in their times. They were too slow, however, and it was evident at the outset that they had no possible chance of winning the race.

The Sunbeam driven by Richard promised well, but was handicapped soon after the start by the breakage of a water pipe to the carburetor jacket, and as the result of this leakage was obliged to stop on several occasions for water. On the straightaway the car was as fast as the Delages, but it was not so well handled, and whenever driving skill had to be displayed on the turns and the hills the French would get away.

English Inferior as Drivers

As drivers the Englishmen were decidedly inferior to the Frenchmen; this is not surprising in view of the entire absence of road racing in England. Brooklands track is no substitute for road work, and even the British engineers admitted that their drivers had a lot to learn from such men as Bablot, Boillot, Goux and others. After working up to seventh position and being the first of the foreign cars, Richard missed the hairpin turn at St. Martin and collided

with the edge of the footpath, the result being a bent front axle.

One remarkably good feature in connection with the Sunbeam crew was the arrangement for filling the gasoline and oil tanks. The gasoline was carried in a large tank behind the driver's seat and embodied within the pointed tail. There were two very large-mouthed fillers. Gasoline was handed over from the pits in a couple of cylindrical vessels not less than 4 feet in height, with a mouth designed to fit the tank filler. As soon as the can had been put in position a plug was opened in the bottom and the fluid gushed out, the operation of filling the tank with these two cans being not more than 15 seconds. A similar method was adopted for the oil tank.

Troubles of the Calthorpe

Russell Fletcher, of the Calthorpe team, was put out of the running at an early date by the breakage of the gasoline feed pipe. His team mate, Robinson, was supplied with a can of water in place of gasoline; it was only when his motor stopped that he discovered the error, the repair of which took over an hour, making it impossible for him to finish before the race was called off. This left Burgess alone in the running for the Calthorpe team, and it was he who finished first of the foreign contingent, in sixth position.

Zuccarelli, the Spaniard who won the voiturette race for Hispano-Suiza on this course last year, went out before he had covered 10 miles. On an easy bend on a down grade at the commencement of the 8 miles of magnificent switchback highway—a bend which had been taken by Zuccarelli scores of times—a rear smooth tire skidded. The non-skid failed to hold and at over 79 miles an hour the Lion-Peugeot car dashed into a tree on the roadside, ripping the bark off for a height of 18 feet from the ground and shooting the mechanic over a hedge 10 feet in height. Zuccarelli escaped without a scratch; the mechanic suffered the loss of a tooth; the car will never race again. Romano, one of the Gregoire drivers, furnished the only other smash, colliding with a tree on a bend and breaking the front axle.

Louis Wagner was convinced at the outset that he had no possible chance of being in the leading group. He had received his Alcyon racer exactly 24 hours before the time to start in the contest, and rather than run it to destruction in a futile attempt to win, had the wisdom to withdraw after covering a round. When properly tuned up the car will be a most serious competitor, and one that will be watched with interest at the Sarthe grand prix next month.

The redoubtable Hemery also failed to figure. After thoroughly testing his car he announced that if he did not form one of the three leaders it would be because he was dead. The motor was dismounted for verification just before the race, re-assembled, tested again and found to have

lost 10 miles an hour. Hanriot was another crack who disappointed the public. Engaged by the Lion-Peugeot company to replace the deceased Giuppone, he never figured better than sixteenth. He showed none of the dash and daring which characterized him as a Darracq and Benz driver and when he stopped at the pits appeared to be in no particular hurry to get away again. On one occasion he allowed the mechanic to tie up a broken mudguard with wire while he wiped up spilled oil with a piece of waste. The public did not fail to see the funny side of the incident and for 5 minutes the famous racer and aeroplanist had to stand such remarks as "Polish the brasses next;" "Why don't you wash the car down?" "Smith's polish is the best you can buy for lamps." After six rounds Hanriot wasted more time at the pits, filling up his gasoline tanks, trying to pour castor oil into a tank under pressure with the motor running, attaching a spare wheel with wire, etc., then pushed his car off the course by the side of the timer's box.

Duray Has Troubles

Arthur Duray, put in charge of an Excelsior car in inferior racing condition, was too sporty to abandon without a struggle. He covered seven rounds, once securing ninth position, and retired with a broken down motor. His team mates were no more successful, not one of them getting among the first six, and only one running the full distance. The second Belgian team of Fif cars was no more convincing, even the veteran Gabriel constantly remaining a tail-end.

Up to half time the race was among Boillot and Goux for Lion-Peugeot, the full Delage team, Porporato and De Marne for Gregoire, with the Englishmen as regularity runners. And among these dozen competition was really keen, for although Bablot and Boillot always occupied the two leading places, they were very close pressed by Thomas, Rigal, Guyot and Goux and even after 250 miles only 4 minutes separated the first from the sixth man. Rigal, who handled his car in a masterly manner, would certainly have secured fourth or fifth position but for a slight breakage allowing the universal joint on his driving shaft to get adrift. After repairing he could have finished, but Louis Delage preferred to guarantee him the amount he would have secured by running the full distance rather than see him come in at the tail end.

The Sprint Events

After the success of the long-distance race, with its record crowds and nearly 2,000 touring cars brought into the little town of Boulogne, the short distance events fell rather flat. There were few cars for the kilometer straightaway and very few spectators. Boillot made the fastest run, covering the kilometer with a flying start in 28%, being equal to 79.8 miles an hour. Wagner in the Alcyon was timed in :30%;

Burgess in a Calthorpe occupied :31, with :32% for Robinson in the same make of car.

Starting from the center of the town and running up one of the main streets lined with houses and laid with car lines for the entire distance, the 2 kilometers hill-climb, over an average grade of 12 per cent., naturally brought forth plenty of onlookers but failed to attract many cars. The event proved a complete surprise, for when times were compared it was found that Boillot's Lion-Peugeot had been beaten by Burgess and Robinson's Calthorpes, and that the Hispano-Suiza, winner of last year's voiturette race, taking part in the climb in an unofficial capacity, had been faster than the French champion. Boillot at first refused to believe the results, but the timers' figures could not be doubted. They were as follows:

Burgess, Calthorpe, 1:57; Zuccarelli, Hispano-Suiza, 1:58; Robinson, Calthorpe, 1:58%; Boillot, Lion-Peugeot, 2:03%; Delpierre, Cote, 2:08%.

The 393 yards standing start and finish race was an acrobatic performance, in which Boillot showed the greatest skill. The run had to be made on a wide, wet asphalt road, the cars being sent away with their front wheels on the starting line and obliged to finish with the second line between the two axles. They were not timed for the finish until they had got into this position. After a little practicing, Boillot found that the best way was to put the brakes hard on as soon as he reached the finishing line, thus making the car swing around as if on a pivot and stop dead with its bonnet facing the starting line. It was a terrible strain on the tires, but the smooth tread Michelins did not fail. Robinson and Burgess, both in Calthorpes, secured respectively second and third positions.

At the weighing-in of the light cars a dispute arose between Henry Depasse, the driver of the Ford car, and the sporting committee. The Ford had been accepted at its ordinary weight of 1,320 pounds, instead of the minimum of 1,763 pounds, on

condition that it was a standard model. At the outset objection was made to the position of the mudguards, which were not directly over the wheels. Depasse maintained that nothing in the regulations obliged him to carry his mudguards immediately over the wheels, and in view of a definite stipulation he was free to fix them where he liked. After much discussion the committee refused to allow the car to start, declaring that as it was not a standard model it must submit to the same rigorous application of the rules as the others. This would have necessitated putting over 400 pounds of dead weight on the car. They declared that when permission was given to start without the minimum weight it was on condition that the car should be standard in every respect. They were of the opinion that the motor presented had lightened reciprocating parts, larger valves, and a special valve timing. Under these conditions it must conform to the same rules as the others.

AGAINST HOOSIER MEET

Chicago, July 1—The Chicago Motor Club has filed with the contest board of the American Automobile Association a protest against a sanction being given the Indianapolis speedway for a Labor day meet, it being claimed that such a meet would conflict with the American Automobile Association's national stock chassis road races which the Chicago Motor Club will run at Elgin on August 25-26. The local organization asks that no sanction be given Indianapolis within 30 days of the road races. Indianapolis, it is understood, desires to run a Labor day meet with the Wheeler & Schebler cup race as a feature and with \$9,000 in cash prizes for the day.

GENERAL MOTORS STATEMENT

Detroit, Mich., July 3—A statement issued today by the General Motor Co., says: "The financial statement of the General Motors Co., issued last week, covering the period of 6 months ending March 31, 1911, had the immediate effect of a sharp raise in stock quotations, there being a gain of fifteen points in common and six points in

the preferred stock of the company, likewise a distinct advance in General Motors' notes. The earnings of the company for the period represented, after making deductions for interest on bonds and a 7 per cent dividend on preferred stock, equaled a surplus of 25 per cent on its common stock. That this showing should have been made in the 6 months of the year usually regarded as the least favorable to motor car selling, argues well for the efficient and economic administration of the company's business, and warrants the expectation of a still more favorable showing to be made during the next 6 months' period. General Motors' stock is now listed on the New York stock exchange, which fact was announced at the time the above referred to report was made."

NEW HOUR RECORD CREATED

London, July 1—Special cablegram—Beach races were run today on the course at Saltburn-by-the-Sea by the Yorkshire Automobile Club and the star performance was the 1-hour drive by the Italian, P. Bordino, who succeeded in traveling 116.13 miles in 60 seconds. The previous 1-hour record, made on the Brooklands speedway, was 89 miles, 892 yards, by a Thames six.

THOMAS DEALERS ORGANIZE

Buffalo, N. Y., July 1—At the dealers' convention of the E. R. Thomas Motor Car Co., held at the Buffalo factory June 26, 27 and 28, an organization known as the Thomas Dealers' Association was formed. This step was taken for the purpose of uniting more closely the dealers and the factory; for maintaining the list price of Thomas cars and to furnish those Thomas owners who are touring the proper technical service while away from home.

The formation of this association was the result of the intense enthusiasm displayed by the visiting dealers and about forty members were immediately enrolled. Having for one of its main issues the welfare of the private owner, to see that he is properly cared for, even though he be in the territory of a foreign dealer, an association of this kind, it is believed, will cause a more intimate relation between dealers and the owners of Thomas cars. The officers of the new organization were elected as follows: F. W. Dart, Hartford, Conn., president; J. W. Barclay, Minneapolis, vice-president; C. E. Whitten, Lynn, Mass., secretary; J. S. Harrington, Worcester, Mass., treasurer.

The executive committee was elected to represent each section of the country: C. H. Henshaw, manager of the New York branch, eastern; Noble S. Bruce, Memphis, Tenn., southern; L. T. Wagner, San Francisco, Pacific coast; Sam Prim, St. Louis, western; E. J. Filiatrault, Duluth, middle western.

E. P. Chalfant, president of the E. R. Thomas Motor Car Co., was elected chairman of a committee of three to work with the dealers on the used car problem.



THOMAS DEALERS IN ANNUAL CONVENTION

Owners Touring from Coast to Coast

Premier Caravan Making Good Progress on Journey From Atlantic City to Los Angeles—Indianapolis Surrenders to Motoring Hosts and Travelers Enjoy Hospitality of Hoosiers

INDIANAPOLIS, IND., July 5—After 2 days of feasting and sightseeing in Indianapolis the ocean-to-ocean Premier tourists again turned their faces westward this morning, after the first 1,000 miles of the long journey, from Atlantic City to Indianapolis. The big party of Philadelphia and New York business men, with their families and friends filling eleven cars, were as enthusiastic as children just out of school and all were confident that their tour would be an unqualified success.

For the reason that Indianapolis is the home of the Premier Motor Mfg. Co., the stop in this city was one of unusual interest to the enthusiastic eastern drivers of Premier cars. President H. O. Smith, of the Premier company, left nothing undone that would add to their comfort and enjoyment. One of the most enjoyable features was a clam bake and picnic, lasting all day, at beautiful Broad Ripple, where boating and swimming are chief diversions.

One of the striking features of the visit of the Premier caravan was the entry into Indiana. The invaders were met at the Ohio state line Sunday morning by a delegation of Indianapolis Premier enthusiasts and after they had been halted by a typical Hoosier of 50 years ago, who stood in the middle of the road with a gun and brought the tourists to a stop, Governor Marshall's message of welcome was read. The Hoosier hold-up man was an actor from an Indianapolis theater and he never acted better. One occupant of each of the cars had previously been apprised of the identity of the hold-up man to provide against possible incidents of a serious nature, and the act provided merriment that will last until the end of the tour. Governor Marshall's message follows:

To the Ocean-to-Ocean Tourists. Greeting: The word "Hoosier" is in reality "Who's Here?" Indiana always inquires at the state line "Who's Here?" Whenever she finds anyone knocking at her doors who simply wants to stop or pass through her boundaries, she always is glad to welcome them. But she is more pleased, when in a marvelous age, any one performs a marvelous feat, whether of skill or endurance. She is glad to know that your effort in the line of skill and endurance, unexampled in the history of motoring, has brought you within her boundaries. She bids you welcome.

When on June 26 the rear wheels of the eleven Premier cars were backed into the waters of the Atlantic and the tourists pointed westward with the purpose of dipping the front wheels into the placid waves of the Pacific ocean. 4 weeks later, several of the tourists filled bottles with water from the Atlantic ocean. This liquid will be emptied into the Pacific main.

Everywhere the transcontinental party has been it has been wined and dined in a manner that, if it did not threaten the

success of the project, made it difficult to follow the strenuous schedule. The tourists have simply been lionized and as it makes no difference whether they arrive at their destination at a specified time they are determined to enjoy themselves to the limit.

The northern route across the Great American desert will be followed, Chicago being the next stop on the schedule after the departure from Indianapolis. From Chicago the route lays through Des Moines, Ia., Omaha, Denver, Cheyenne, Salt Lake City, Reno, San Jose, San Francisco, Santa Barbara and Los Angeles.

The members of this party of ocean-to-ocean tourists are Philadelphia and New York merchants, bankers, lawyers and other professional men, with their families and friends, the personnel being as follows: Mr. and Mrs. George C. Allen, John Allen, C. T. A. Loder, F. L. Howard Weatherly, Hazzard Lippincott, Charles E. Lox, Jr., Mr. and Mrs. J. G. Monihan, John G. Monihan, Jr., of Philadelphia; Mr. and Mrs. N. E. Sprague, Mr. and Mrs. G. E. Horton, Mr. and Mrs. C. E. Brown, Mr. and Mrs. J. H. Murphy, Countess DeCalatrava, John Matthew, F. A. Moller, L. J. Moller, W. Sherman Rose, of New York; Mr. and Mrs. C. F. Cook, Newark, N. J.; Mr. and Mrs. P. W. Belser, Mr. and Mrs. S. M. Root, Louisville; Dr. Edward Dewes, Erie; Ray F. McNamara, Indianapolis.

GOOD DAY FOR NATIONAL

Ossining, N. Y., July 1.—The second annual hill-climbing contest under the auspices of the Upper Westchester Automobile Club was run off this morning on Hyatt hill. There were five events, four under a piston displacement rating and one free-

for-all. The length of the climb was 2,800 feet, beginning with a long level stretch and ending in a hill with grades ranging from 6½ to 11 per cent. Four of the five events were won by National cars, the honors for the other being carried off by Van Wyck in a Mercer in the small-car class.

The fastest time of the climb was made by Zengel in a National, who went the distance in :33¾ in both the free-for-all and the 451-600 displacement classes. The Fiat, driven by Bruce-Brown, and which covered the distance in the morning in a trial spin in :28, had trouble in starting and did not make the showing that was expected from its trial performance.

160 TO 300 CUBIC INCHES		
Driver	Car	Time
Van Wyck	Mercer	:48¾
Sherwood	Mercer	
Craig	Paige-Detroit	
301 TO 450 CUBIC INCHES		
Bragg	National	:38
Rutherford	National	
Disbrow	Pope-Hartford	
451 TO 600 CUBIC INCHES		
Zengel	National	:33¾
Wishart	Mercedes	
Disbrow	Pope-Hartford	
EVENT NO. 4		
No results given		
FREE-FOR-ALL		
Zengel	National	:33¾
Wishart	Mercedes	
Stuart	Flat	
Disbrow	Pope-Hartford	
Bruce-Brown	Flat	

BELGIUM'S MOTOR BUSINESS

Brussels, June 23—Belgium's motor car business in 1910 was the best it has had since the motor car has existed in the land. The export trade passed the \$4,000,000 mark, showing an increase of close to \$1,500,000 over the corresponding period in 1909. The importation of foreign cars is keeping its uphill run, while the motor car parts branch shows a big increase, both as to export and import.

From the statistical government records it is learned that Australia and Argentina Republic are the two countries outside of Europe where the Belgian manufacturers are making steady gain in their export business. While the Australians bought only nine motor cars of a total value of \$21,438 in 1908, they received fifty-six Belgian cars in 1909, the value being \$141,-



HILL AT OSSINING, N. Y., USED FOR CLIMB

124. Last year eighty-nine cars were bought here of a total value of \$175,330. Thus the average price of the Belgian car bought by the Australians was \$2,382 in 1908, \$2,520 in 1909 and \$1,970 in 1910. During those three years the importation of motor car parts amounted respectively to \$17,818, \$11,025 and \$47,230.

The cars and parts trade with Australia increased from \$39,256 to \$222,560 in 3 years. American manufacturers should investigate the reasons of this rapid increase of business. Considering the fact that it takes at least twice as long for shipments to reach Australia than from the United States, that the charges for transportation are higher, that the prices of cars are higher, it seems that there is an opportunity for the manufacturers in the United States to get some of that business.

The following tables give an exact idea of what the motor industry of this small country has become during the last few years:

TOTAL EXPORTS + OR -			
Year			
1910	\$4,087,032	+	\$1,485,153
1909	2,601,879	+	35,317
1908	2,566,562	+	49,338
1907	2,517,234	+	226,940
1906	2,290,294		
TOTAL IMPORTS + OR -			
Year			
1910	\$1,344,459	+	\$413,660
1909	930,799	+	221,551
1908	701,248	+	199,273
1907	906,521	+	76,271
1906	824,250		
MOTOR CAR EXPORTS			
Year	Number	Total value	Average price
1910	808	\$2,124,780	\$2,629
1909	592	1,339,461	2,262
1908	452	1,207,327	2,671
1907	454	1,144,289	2,520
1906	552	1,137,265	2,052
MOTOR CAR IMPORTS			
Year	Number	Total value	Average price
1910	415	\$ 495,941	\$1,195
1909	351	442,249	1,260
1908	204	280,637	1,375
1907	225	310,421	1,384
1906	182	249,137	1,369
MOTOR CAR PARTS EXPORTS			
Year		Value	
1910		\$1,637,436	
1909		1,034,137	
1908		1,061,609	
1907		1,053,994	
1906		743,205	
MOTOR CAR PARTS IMPORTS			
Year		Value	
1910		\$ 831,169	
1909		478,014	
1908		411,934	
1907		564,330	
1906		539,198	

American Cars Through German Eyes

Trade Paper in Fatherland Declares There Is No Danger of Yankee Invasion and Claims United States Product Is Not So Well Built As the European Machines—Austrian's View

BERLIN, June 20—According to a German trade paper Germany is not much frightened so far as an invasion of the American car is concerned.

"We have no fear of the American car, because in addition to it being badly or poorly assembled it is not made with the high-grade metals found in good European cars," says the paper. "This is due to the fact that it does not pay, owing to the short life of the car. These shortcomings, or what is lacking in the American car, is what the competent European motorists require absolutely, and just so long as this condition prevails there will not be any market for the American car in Europe. American manufacturers will find this out very quickly."

This expression of opinion comes from an Austrian consul located in a large American city. He claims to have made a very thorough study of the situation. In speaking further regarding the American car he says: "The characteristic feature of the United States car industry is the endeavor of the manufacturer to produce a serviceable and fast car at the lowest price. This object of the manufacturer is obtained by giving little attention to the outer beauty of the appearance of the car; by paying only secondary attention to the fine detail work; by continual effort toward simplification of car parts; by research departments constantly searching for new ideas; by continual encouragement to designers and workmen to bring out new inventions; and lastly by enormous production."

"The idea prevailing in Europe that standard American cars are made of parts built in various factories is erroneous. If this actually happens, or is the case with a few makers, it is nevertheless a fact that all the parts, excepting rubber goods and

lamps, are made by the factories themselves."

In speaking further on the processes of American manufacture this Austrian consul continues: "The assembly work of the United States car is badly done. For this work few skilled workmen are employed, the companies rather engaging workmen who have been given hasty instruction. The tools used to make the parts in first-class cars are first class, and even if the work of assembling is put through with uncomparably less exactness than in Europe, where artists build cars for a lifetime, the cars nevertheless fulfill the requirements for which they are intended."

It is somewhat amusing to read the expression of this official on the American selling scheme: "All the manufacturers advertise extraordinarily and all the time in magazines, newspapers, and continually send out pamphlets and catalogs," says the consul. "When a prospective purchaser is found, this prospect is taken out for rides during weeks, daily and even hourly by the agents of the car. He is worked and is not left alone until he either has decided to buy or until doubt as to his financial standing has arisen."

COLORADOANS BUILD A ROAD

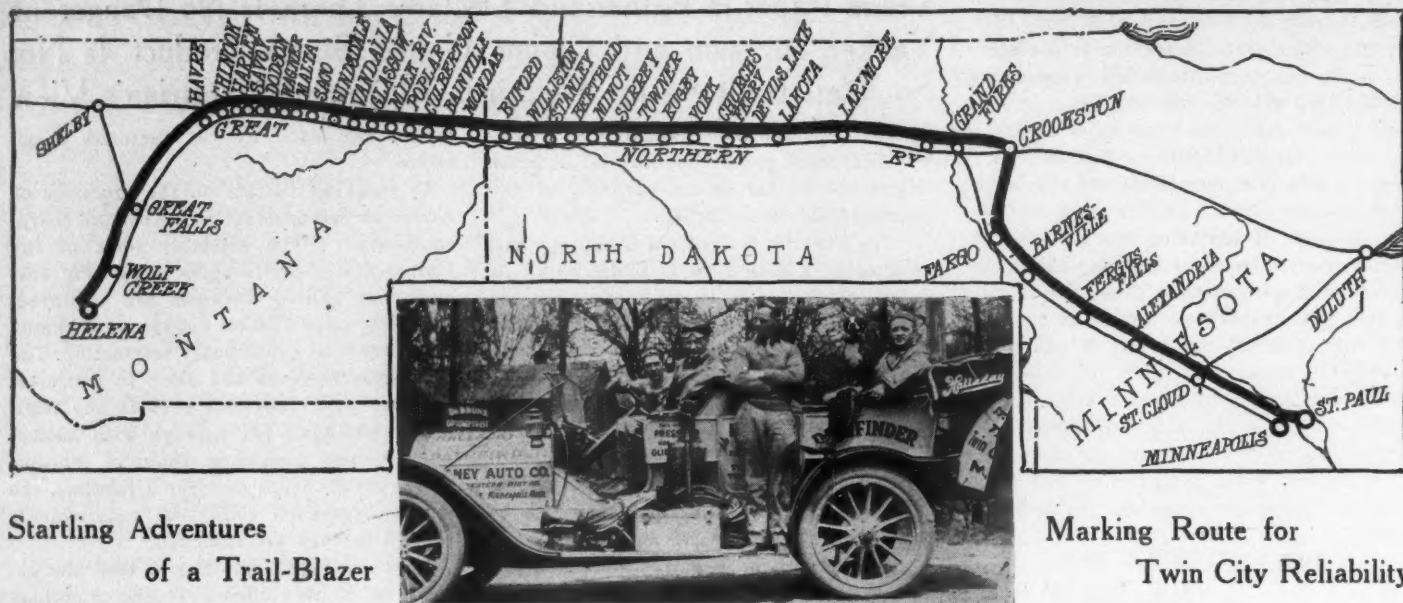
Trinidad, Colo., July 1—The conversion of 33 miles of a rocky mountain trail into a fine motor boulevard and one of the prettiest scenic drives in Colorado was the task accomplished in 3 hours on June 14 by the Trinidad Motor Club. Five hundred men and boys and nearly 100 teams aided in transforming the road and opening for the use of the tourist an avenue leading to some of the best trout streams in the west. Work started at 8 o'clock in the morning and before noon the entire party, borne by half a hundred cars, was on its way to the clubhouse of the Stonewall Country Club for a picnic dinner, which marked the completion of the enterprise.

The big job was successfully completed within the space of time fixed through the careful attention given by F. J. Radford, chairman of the good roads committee of the motor club, to the arrangement of all of the details. The distance had been carefully measured and was divided into forty-four sections. Over each section a member of the club took charge and employed as many assistants as were necessary to complete the work within the given length of time. Tons of dirt were piled upon rocky places and thousands of rocks were thrown out of the right-of-way. Chuck holes were filled with dirt and bumps were leveled by plows.



ZENGEL IN NATIONAL A STAR AT OSSINING

Pathfinding for Northwest's Big Tour



Startling Adventures
of a Trail-Blazer

Marking Route for
Twin City Reliability

MINNEAPOLIS, Minn., July 3—When President Reuben Warner, of the Minnesota State Automobile Association, and Dr. C. E. Dutton, A. A. A. representative in Minnesota, got together to select a route for the 1911 reliability tour for the Dispatch and other trophies 3 months ago they found themselves confronted with a problem which puzzled them. Various tours during the past 4 years—the St. Paul Dispatch tours, the Minneapolis Journal tours and the Minneapolis Tribune tours—had used every available route, and it seemed impossible to pick out a new one that would be of interest to Twin City and Minnesota motorists.

Birth of the Idea

"Unless we pick one of the old routes and make a few changes we are up against it," said Dr. Dutton.

"If we take an old route the interest will flag and we can't get the entries," replied Mr. Warner.

As the discussion was at its height President Louis W. Hill, of the Great Northern Railway, strolled into the room. He listened for a few moments.

"If the people are tired of contesting on Minnesota roads which have benefited from these tours for 3 or 4 years, why don't you send them farther west?" he asked. "Go to Helena, for instance. The people out there are strong for the good roads movement. The territory is adjacent to the Twin City, and it's a route whose scenic beauties are unexcelled."

Thus was the idea of a Twin-City-Helena trophy tour born. The clubs were told of it. They thought it was great. Twin City dealers were notified. They jumped at the chance. Business organizations at both ends of the line endorsed it. Entries began coming in before definite details were announced. The success was assured.

ROUTE OF TWIN CITY-HELENA TOUR AND PATHFINDING HALLADAY

"Can we make a tour of this length?" asked Dr. Dutton.

"Send Charles Harrington out as pathfinder and find out," replied Mr. Warner. "Send him early. If a pathfinding car can make it in May the tour can get through in July."

Mr. Harrington, who is secretary of the Minnesota association, selected as his crew Howard Kahn, motor editor of the St. Paul Dispatch, to be assistant pathfinder. George Daubner, of the Halladay plant at Streator, Ill., was selected to drive the same Halladay he drove as press car in the Glidden last year. Edward Ovenshire, of Minneapolis, was picked as the assistant driver, and C. E. Babcock was taken along as a telegraph operator.

The Halladay 40 set out from the Dispatch building, St. Paul, at 10 o'clock, May 10, leaving the Journal building in the Mill City an hour later. At the latter place the pathfinders picked up Mike, a Boston bulldog which has made more than 60,000 miles in a motor car. As a dog Mike was a huge success. As a mascot he was a colossal failure.

It began raining 20 miles out of Minneapolis. The crew twisted Mike's tail, but it didn't do any good. The pathfinder was on the road 13 days. It rained 12; that is, it either rained, snowed or hailed.

Luck of the Pathfinders

Minnesota roads are good—in dry weather. They are as smooth as a floor and hard as a rock. But just let it rain for 4 or 5 hours! Any other pathfinder than C. Harrington and any other driver but G. Daubner would have turned back. But Harrington had nerve and Daubner had confidence in his car. Weather that had been clear for 2 weeks previously

seemed to have turned its spite on those bedraggled route makers. Hard luck overtook them at every turn.

The progress of the car had been well heralded. The Minnesota association's tour—the Dispatch trophy tour as it is called—is known throughout the northwest. And the papers were full of news about the expedition. Before the car was out 2 days it had been dubbed the rainmaker. Districts that averaged 5-10 inch rain a year were visited by cloudbursts. And it made the car and its weather-hardened crew popular. But for the entertainment they were offered in every town and for the courtesy of the people in furnishing pilots and maps the route never would have been finished.

Vagaries of the Weather

The car ran through the rainstorm the first afternoon and after leaving St. Cloud, 50 miles out, the sun came out strong; so strong, in fact, that it blistered the backs of the dusty crew. Near Sauk Center the wind began to blow. Sauk Center county is noted for its sandstorms and it outdid itself on this occasion. It billowed and eddied. It blinded Daubner in spite of his goggles and the car had to pull through it and wait at the side of the road for an hour.

It turned cold during the night. The second day's start was made in the face of a blizzard. It kept getting colder. Rain and sleet fell. The roads became slippery and 10 miles an hour was a dangerous speed. The crew got out several times to run at the side of the car and warm themselves. Six o'clock found the car 40 miles from Barnesville on a road which had been made useless for the present by repairs. The car had to turn around and seek a new route. At 9 the snow was so thick that Daubner could not see 5 feet ahead. It clogged on the gas lights and stuck to

the windshield. The crew decided to give it up and drove the car into a barn.

After an hour's attempt at sleep in a shed, where wind and snow were coming in at every crack, Daubner went in search of a farmer. He returned with a map with which Harrington was able to guide the party into Barnesville.

The snow turned to rain. The car was in the Red River valley. Two hours' rain in this fertile valley is enough to discourage the average Minnesota motorists. But the pathfinders pushed on. Guided by a roadster that got stuck in the gumbo twice before the car had progressed 10 miles, the crew hoped to eat dinner in Fargo, N. D. But the pilot car broke its frame, causing 2 hours' delay, and the pathfinder, carrying enough gumbo on its wheels to dam a small river, didn't reach Fargo until 3 p. m.

North of Fargo toward Crookston a bridge over the Red river was being repaired, and on the advice of Fargo enthusiasts the crew waited over the afternoon and night in that city. The sun shone the next morning and the sandier roads to the north dried up, making progress very satisfactory. The clouds began to gather again in the afternoon, however, and when the crew left Crookston for Grand Forks it had begun to rain again.

Pilots Stuck in the Mud

On the run from Grand Forks the next day Dave Hyman, a motorist with more nerve than judgment, went ahead as pilot. Three times did he dive into sloughs from which his engine could not pull him out. Daubner each time uncoiled his long rope and with the aid of a friendly telephone post jerked the car from the mud. It was the same story from Devil's Lake to Rugby the next day. A pilot had to be pulled from the slough twice. The pathfinder either went through these mud holes with mud hooks on or went around them. At Rugby it rained all night and the storm was increasing when the car against the advice of every motorist in the town started for Minot.

Near the village of Leeds the storm became so furious that it was impossible to see more than a few feet ahead. Lightning flashed and the wind blew the rain in sheets. Approaching a cross roads church, the car stopped and Harrington got out to find a farmer for directions. Babcock, the Western Union operator, and Ovenshire, the assistant driver, sat on the running board, making uncomplimentary remarks about the weather. Suddenly with a deafening crash lightning struck the church not 30 feet away, shattering the steeple and setting the edifice on fire. The two members of the crew whose feet had been on the ground were thrown 25 feet. Babcock was unconscious and Daubner severely stunned. Both men came about all right in about 10 minutes and the crew turned its effort toward putting out the fire in the church. They were unsuccessful, the building burning to the ground.

"That's the end of our bad luck," said Daubner, after finding that his car had not been hurt. But it wasn't. The sun came out late in the afternoon and was shining brightly when the car pulled into Minot at 5 o'clock, but the rain was pattering on the windows when the crew embarked the next morning.

On the Reservation

Crossing into Montana at Mondak, the crew entered the Fort Peck Indian reservation at Culbertson, a few miles farther. Guided by a half-breed Indian, excellent progress was made over the roads, which were little more than pony trails. The department of the interior through Indian Agent C. B. Lohmiller had had them fixed up, however, and they were a pleasant relief to the muddy roads that had been encountered. But the hoodoo, or the jinx, or whatever you want to call it, hung on to the tail lamp. Crossing Tule creek, with its quicksand bottom on an improvised bridge, the timbers broke and the car sank to the hubs. It was the only time on the whole tour that the car had been stalled. Indian workmen repaired the

bridge, helped to get the car on the timbers and the start was made again. The car pulled into Wolf Creek, the sub-agency, that night in a hailstorm and accepted the invitation of Clyde Patton, the government expert farmer, to sleep on his floor.

The rain and cold continued. But the crew was accustomed to it by this time and it was scarcely felt. Over the hilly buffalo trails, past Indian tepees, near which the stolid native Americans smoked their pipes or enjoyed their dog feasts, the car sped, arriving at Hinsdale, a typical cowboy town, early in the evening of the tenth day. From Hinsdale county and state road officials guided the party to Montana's wildest western town, Havre.

Among the Foothills

The twelfth day, from Havre to Great Falls, brought the car into the country of the foothills, with the Rockies in the distance. Through the misty rain the snow-capped peaks could be seen, and the crew realized that its goal was not far off. The spirits of the crowd had been kept up by a feeling of good fellowship added to by the hard task the expedition



TYPICAL SCENE ON THE FORT PECK RESERVATION



WHERE 1,000 INDIANS WILL DANCE FOR THE MOTORISTS

had been called on to perform. Winding around the buttes, the car came into view of Great Falls, one of the biggest little cities in the world, and the end of the route was less than a day's journey. Accompanied by two cars from Great Falls, the pathfinder left at 10 the next morning for Helena. And this time the hoodoo had been left behind. It didn't rain. One of the pilot cars ran its headlights into a misinformed cow, damaging both the headlights and the bovine. The trip through the Prickly Pear canyon and over the mountains to the capital of Montana was such a wonderful thing scenically, however, that it could not be marred by any accident.

Following the arrival at Helena, H. W. Childs, president of the Yellowstone Park Association, took charge of the party, taking the members on a trip into the Yellowstone to give them a rest. The route from Helena to Gardner was mapped by the pathfinders, as it will be one of the important side trips which practically all of the tourists will take.

In the park Mr. Childs took them to the new \$800,000 hotel at the Grand canyon, through the various geyser basins, and conducted them personally to as many sights of this wonderland of the world as they could see in 5 days.

In regard to the tour itself, sixty entrants are assured. Ten trophies have been given; 1,200 of the 1,350 miles of the road have been repaired, and the rest will be repaired before the start of the tour is made on July 20.

Hotel Train Arranged

President Hill, of the Great Northern road, has arranged to send a hotel train, including two garage cars, sleepers, diners and a newspaper car, along. This will meet the tourists at all night and noon stops. Non-contestants will join the tour at various points and go as far as they like. An Indian dance will entertain the motorists on the Indian reservation; Malta is going to give a cowboy tournament; entertainment has been promised everywhere.

The trip will take 9 days, including a Sunday's rest at Devil's Lake. Dozens of side trips, including one to the Yellowstone park, to the Glacier national park, and many others, have been arranged from Helena. These, however, are optional. The cars will be shipped back by express at a special rate arranged by the various railroads.

Great Interest in Tour

The enthusiasm of the northwestern dealers for the Twin City-Helena tour is attributable to three causes. First, the selling possibilities in the territory which the run covers are almost unlimited. Although many of the towns have agencies, only five different cars, all low-priced, are represented in the district. This includes two factory branches at Fargo. The Great Northern railway's efforts to make this country a rich farming country have suc-



RAINBOW FALLS AT GREAT FALLS, MONTANA



PATHFINDERS CAMPING AT TULA CREEK

ceeded. The farmers are progressive and they have money. So far the higher-priced cars have not been introduced. St. Paul and Minneapolis dealers think that if once the high-priced machines are displayed and proper means are taken to develop a demand which is bound to exist hundreds of cars can be sold.

"If our factory had refused to put in an entrant I would have put it in myself," said J. H. Seagraves, of the St. Paul Pierce-Arrow agency, in discussing this matter the other day. "The opportunity to sell high-grade cars is absolutely unlimited."

The farmers along the route of the tour are motor crazy. They say so themselves, and that they are not idle talkers is shown by the fact that most of the road work that is being done as a result of the tour is being done by the farmers. On the pathfinder tour eighteen pilots guided the expedition. Of this number eleven were farmers. The spirit of antagonism toward the motor cars which formerly existed has died a natural death. Many of the farmers have cars. Those who haven't are always glad to pull their teams to the side of the road to let the cars go by.

The diversified territory is the second cause that makes the tour attractive. The route begins with Minnesota and North Dakota's farming territory. The fact that the tour starts just before the grain is ready to be harvested has caused many grain men to want to make the trip. It will give them an idea of the size of the harvest. Getting men of this kind interested in a motor car tour is a boost for the industry. The tour includes the grazing and ranch lands of the west, and stockmen are interested for this reason.

The third cause might be included with the second. After Montana has been reached the scenic splendors of the route begin to unfold themselves. As a vacation trip—and a vacation trip puts prospects in the proper frame of mind—no better route could have been selected. The roads through the foothills into the mountains have been made perfect according to reports which President L. W. Hill, of the Great Northern road, is receiving from his agents daily. Many of the roads are old buffalo trails, but they have been worked and the only difference between them and the roads farther east lies in the fact that they are winding and restful. After leav-



THE FAMOUS GRAND CANYON OF THE YELLOWSTONE



POINT OF ROCKS, MONTANA, PART OF NEW CANAL

inv Havre on the next to the last day's run the snow-capped peaks of the Rocky mountains are constantly in view.

Many Entertainments Billed

The entertainments which have been arranged for the tourists must not be forgotten. Chief of these is the Indian celebration given by Indian Agent C. B. Lohmiller, of the Fort Peck reservation, at Poplar, Mont., on the sixth night. One thousand red skins will take part, their Fourth of July celebration having been postponed until this time. At Malta there will be a cowboy tournament. Every noon and night control will have something out of the ordinary.

Dealers are unanimous that the industry will receive the biggest boost it has ever had in the northwest as a result of the tour. Not only are the entries coming in rapidly enough to assure sixty cars at the start but many persons who do not own cars are preparing to go.

WISCONSIN ROUTE OUTLINED

Milwaukee, Wis., July 2—The contest board of the Wisconsin State A. A. has confirmed the final selection of a route for the second annual reliability tour,

July 17 to 22, 1911, as rechecked by President M. C. Moore, pathfinder and pilot. Instead of 5 days of running and 1 day of rest, it has been decided to run all of the 6 days. The fifth day's run as originally planned was 220 miles long, over the biggest hills in Wisconsin, and this has been divided into two days of actual running. The itinerary is as follows:

First day, July 17—Start from Milwaukee and finish at Marinette, Wis., via Port Washington, Sheboygan, Manitowoc, Two Rivers, Green Bay and Oconto.

Second day—Marinette to Wausau, via Peshtigo, Oconto Falls, Shawano, Neopit, Mattoon, Antigo and Merrill.

Third day—Wausau to LaCrosse, via Mosinee, Stevens Point, Grand Rapids, Marshfield, Neillsville, Merrillan, Black River Falls, Sparta, Bangor and West Salem.

Fourth day—LaCrosse to Lancaster, via Viroqua, Viola, Richland Center and Lancaster.

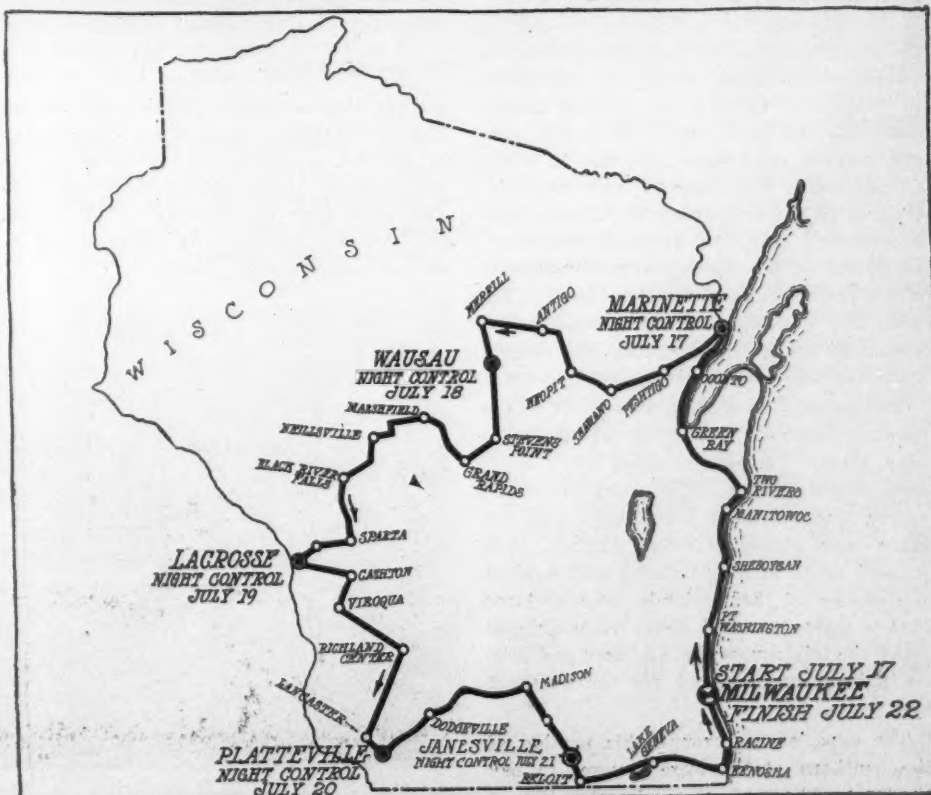
Fifth day—Lancaster to Madison, via Dodgeville, Ridgway, Mount Horeb, Mazomanie and Middleton.

Sixth day—Madison to Milwaukee, via Stoughton, Edgerton, Janesville, Beloit, Clinton, Delavan, Lake Geneva, Burlington, Kenosha, Racine and South Milwaukee.

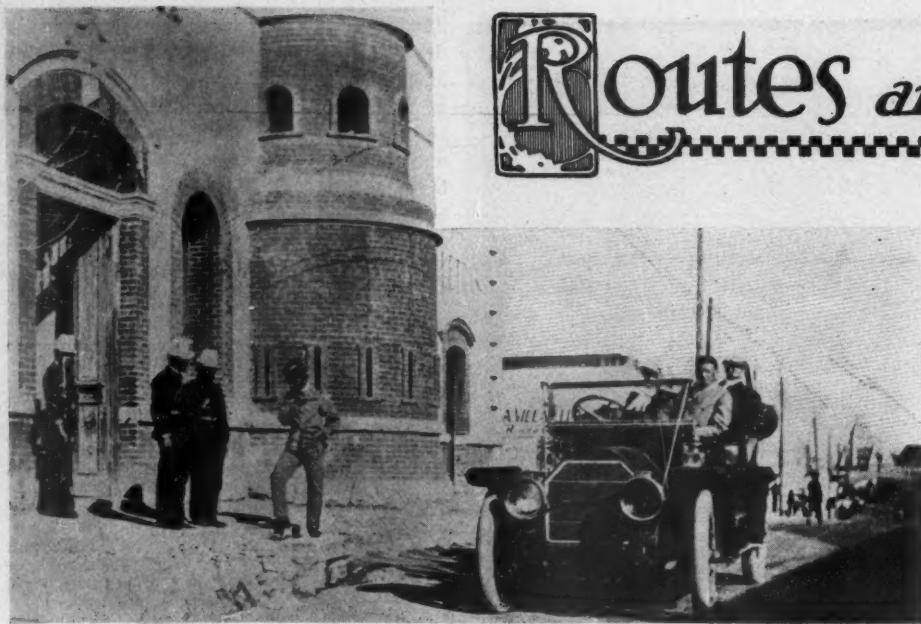
The proposed hill-climb will not be a distinct affair, but the route is so laid out that all contestants will be required to negotiate the steepest slopes to be found in Wisconsin in order to finish the run. These hills will be encountered in the fourth day. The semi-annual meeting of the W. S. A. A., scheduled to occupy the holiday on July 20, will be held on the evening of the 19th at LaCrosse.

The tour will practically encircle the state, with the exception of the northwestern section of Wisconsin, part of which was covered by the 1910 tour.

It has been definitely decided to make Lancaster, Wis., the night control on July 20, the choice lying between Lancaster and Platteville. The city of Janesville will be the last night control instead of Madison.



ROUTE TO BE FOLLOWED BY WISCONSIN STATE TOUR



A MEXICAN PRISON AT JUAREZ, ACROSS THE BORDER FROM EL PASO

CLEVELAND, O.—Editor Motor Age—One of the most ambitious of motor trips in the way of family pleasure tours was a run across the continent taken by Walter H. Hanson, of Saratoga Springs, N. Y., and his family this spring. The party consisted of Hanson, his wife and son and the chauffeur in a Stearns touring car. Starting from New York, the journey to San Francisco was made by way of the southern route through Atlanta, New Orleans, Houston and the Arizona desert.

Crossing the United States strictly for pleasure these tourists have during their transcontinental trip established a record, not for speed, but for taking their motor car across stretches of country never before traveled by a big touring car.

Disregarding the advice of friends in the East from the very start and also the advice of the most sturdy of westerners in Texas and Arizona, the tourists declare that this southern route was chosen simply because they were told that it would be impossible for a car to make the trip. Ordinarily the trip across the desert from Ehrensburg, Ariz., on the Colorado river, to Mecca, on the western edge, is regarded with fear by the California motorist. Yet with the knowledge of the country furnished by the guide, the party was able to make the trip across this barren country.

The journey from New York state to the heart of southern California was made by easy stages. In places stops of a week were made. From New York city the course lying through Washington and Atlanta was chosen. From Atlanta they wanted to go to New Orleans and, against the advice of their friends, who declared that a motor car had never been able to make the trip across the Alabama and Mississippi country, started for the Crescent City.

The experiences through this portion of the southern states were severe, to say the least. The roads were almost hub deep

in the sticky southern mud, in a thousand and one places the roadbed had been washed away in spots there was water up over the running boards of the car. Sometimes this state of affairs lasted for several miles.

New Orleans was finally reached, however, and here a stop of several days was made for rest and sight-seeing. After leaving there and continuing westward through Louisiana and into Texas, the roads continued to be in a condition similar to that found in Mississippi. Almost until Houston was reached they were compelled to wallow in and over the submerged highways, taking chances of making the next town in time for a night's rest. In Houston and again in San Antonio a week was spent enjoying the cities' hospitality.

Across the Plains

They then continued westward, climbing higher and higher each day until the city of El Paso on the border of New Mexico was reached. Here another stop was made and then the trip hardest of all across the New Mexico plains to Pheonix and on to Los Angeles was started.



AMONG THE SAGE BRUSH NEAR SAN MIGUEL HILL, NEW MEXICO

Routes and Touring

Across the Continent By the Southern Route

"We made Phoenix all right," declared Mr. Hanson upon his arrival at San Francisco, "and there we picked up George Dake, who acted as our guide through to Los Angeles. Of course, even Mrs. Hanson had become hardened to the bad roads of the south and the jolting didn't bother us much. We reached the Colorado river all right and were ferried across by the Indians there. We pulled out of Ehrensburg one morning expecting that with ordinary luck we would reach Mecca that night some time.

Sandstorm in the Desert

"A sand storm in the desert was something which cannot be described. It is an experience to go through with before it can be appreciated. While it was an extremely trying experience insofar as our eyes are concerned, I enjoyed it to a certain extent. The wind blew the sand so that one could not see twenty feet ahead. The sand was deep and fine as powder, making it a hard matter to hold the big car straight. Sometimes you could see the tracks of a wagon which had gone ahead, and sometimes the road looked just like any other part of the desert. We didn't get lost, but I can easily imagine how a motor car could very easily become lost going over this stretch of country between Mecca and Ehrenburg.

"But when you strike the civilized portion of California then you begin to realize what a paradise it is. Outside of a few roads in New Jersey I don't know of a single state which can boast of such good,

Information

Inquiries and Communications From Tourists

ordinary highways as southern California. In fact, even the road through the desert was much better, and we really enjoyed the trip almost as much as going through the states of Alabama, Mississippi and Louisiana.

"Down in Louisiana we were held up one night by a band of ruffians who declared that we could not pass. We turned around, went back to the nearest town, got the deputy sheriff out of bed and then, with the deputy on one running board and me on the other with gun in hand, we forced our way through the mob.

"The run from Mecca to Los Angeles, a distance of 154 miles over some of the worst roads in the southern part of the state was made with the son at the wheel. The transcontinental party was met near Pomona by a party of newspaper men who piloted them into the city. On the return into the city, the local car was left behind by young Walter Hanson, who came flying over an unknown road faster than even most road racers would dare to take it."—H. H. H.

FILLS GAP IN YELLOWSTONE ROUTE

Pocatello, Idaho—Editor Motor Age—In Motor Age, issue May 18, in an answer to an inquiry for a motor route from the Black hills to the Yellowstone park and thence to Los Angeles, Cal., a route is mapped from Cheyenne to Thermopolis and thence to Cody or Gardiner, and then the prospective tourist is sent on the back track to Cheyenne. From there Motor Age directs him to Rawlins, Evanston and Ogden, 800 miles out of his way.



THE PACIFIC AT LAST! ON THE 17-MILE DRIVE OUT OF MONTEREY, CALIFORNIA

Now, in case the tourist enters the park by the northern entrance he can go by the way of Butte and follow the Oregon Short Line south along the Big Hole river through Spencer, Idaho Falls, Blackfoot, Pocatello, McCammon, Idaho, and on to Ogden. Should the traveler desire to enter the park through the southern way, which is much nearer, he can strike the railroad at either Yellowstone or at St. Anthony.

All the roads are in first-class condition with the exception of about 5 miles of sand between Blackfoot and Ross Fork Indian agency, and this will shortly be converted into one of the finest roads in the country, the legislature having recently donated \$20,000 to have the same macadamized. The fishing alone along the Big Hole river and down as far as Pocatello is ideal, and the wild chickens are in abundance.—W. Cureton.

CENTRAL NEW YORK ROADS

Syracuse, N. Y.—Editor Motor Age—The Automobile Club of Syracuse is carrying out a useful plan this year by soliciting all kinds of information from tourists

regarding the state of the roads they encounter, general mistakes in existing routing information, etc. The results benefit tourists throughout the country. Writing to the Syracuse club from Riverside Inn, Chester, Mass., Lucius L. Button, of Rochester, says that some club should look up a better way for eastbound tourists below Utica. He says the detour by the so-called Dutchtown road is atrocious, and in wet weather going east means chains and low gear at this point.

C. W. Moody and a party from Akron, O., writing from Boston, in regard to the roads between Syracuse and Schenectady, say to tourists to turn to the left at the Manlius school instead of going by way of Cazenovia, which is twice as long. This party took the longer route, the direct state road being torn up, but found many miles of it in horrible condition; also poor roads between Little Falls and Fort Plain and bad stretches from there to Schenectady.

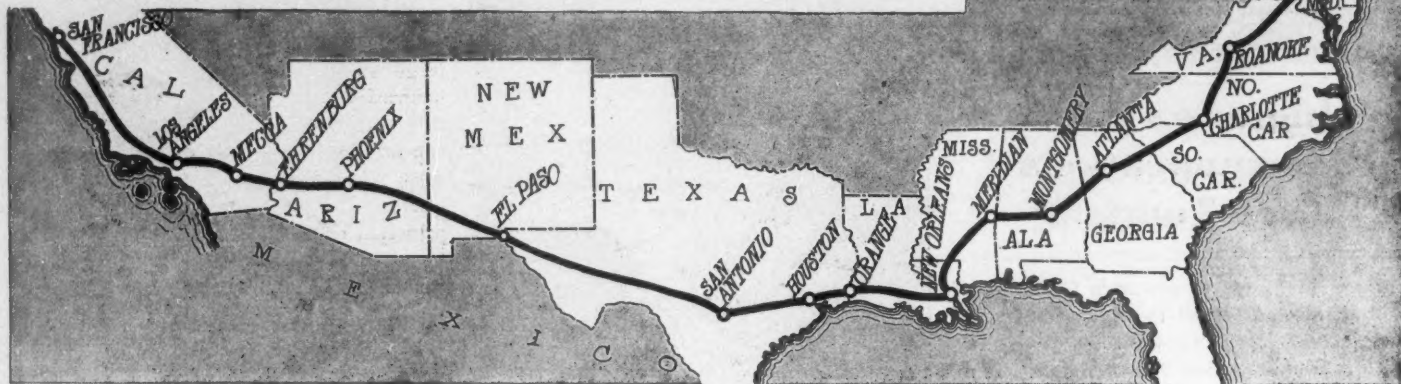
M. Crouse Klock, of this city, who is to tour Europe with his family this summer, selected a new route from Albany to New York when he drove to New York to sail to London. Instead of following the Hudson river route, Mr. Klock crossed from Albany to Pittsfield. The Hudson river road is being torn up for state construction in several places. Mr. Klock says the Pittsfield route is a beautiful trip and he recommends it to tourists. Here are the towns: Pittsfield, Lenox, Stockbridge, Great Barrington, Egremont, Salisbury, Lakeville, Sharon, Pawling, Paterson, Carmel, Lake Mahopac, Anawalk, Yorktown Heights, Ossining, Tarrytown, Irvington, Yonkers and New York.

Four miles of road between Otisco and Vesper are torn up for the building of a state road and motorists are advised to seek another route in preference to the one between these towns until the repairs have been completed.



FIGHTING TEXAS SAND NEAR SIERRA BLANCA. JOURNEY MADE IN EASY STAGES

THE ROUTE FOLLOWED BY THE HANSON PARTY ACROSS THE CONTINENT FROM NEW YORK TO SAN FRANCISCO, SHOWING THE STATES PASSED THROUGH AND THE CITIES AND TOWNS WHERE STOPS WERE MADE. ALL OF THE ATLANTIC SEABOARD STATES WERE TRAVERSED FROM NEW YORK SOUTH AS WELL AS THE SOUTHERN TIER OF STATES TO THE PACIFIC COAST



Parties going west, if passing through Seneca Falls, after leaving the ferry, should take the first turn to the right to the cemetery, bringing them straight into the center of the village; then go straight on through Waterloo.—O. L. L.

A NORTHWESTERN ROUTE

Bellingham, Minn.—Editor Motor Age—Kindly give me a route from Ortonville, Minn., to Grand Forks, N. D. I should like to know the distance and condition of the roads as to sand, hills, etc.—G. Eddy.

A direct route to Fargo lies through Graceville, Dumont, Wheaton, Fairmount, Wahpeton, Dwight, Abercrombie, Christine and Dickinson. A longer one takes you through Graceville, Morris, Cyrus, Starbuck, Glenwood, Garfield, Brandon, Evansville, Ashby, Dalton, Fergus Falls, Elizabeth, Pelican Rapids, Rollag and Hawley. From Starbuck to Glenwood the road spoken of goes north of Lake Minnewaski by the state fish hatcheries, but there is also a road running along the south side of the lake which is a little longer but very beautiful. A route of 87 miles from Ortonville connecting with the Alexandria-Fargo stretch at Fergus Falls takes you through Graceville, Dumont, then north 5 miles to the Wheaton-Herman road, then through the town of Herman and through to Fergus Falls.

From Fargo to Grand Forks you can go either on the west side of the river through North Dakota or on the east side of the river through Minnesota. Motor Age is advised by a motorist who has recently been over the road, to travel 3 miles north of Fargo and cross the river to the Minnesota side, following the main traveled road to Georgetown and on to Perley, Hendrum and Halstad, where you return to the Dakota side and follow the Great Northern railroad through Hillsboro and on to Grand Forks. You might prefer to go to Wahpeton from Fergus Falls, thence on to Casselton and Larimore and from there to Fergus Falls.

You will find the roads somewhat sandy, and it is very possible you will encounter stretches of black gumbo soil, which is

very bad to travel over in wet weather. The Dakota roads are all clay, no sand and no hills and good time can be made in almost any weather.

DESCRIBES AYR LINE ROUTE

Grant City, Mo.—Editor Motor Age—Having noticed a good many inquiries for touring routes from the southwest to Chicago and the north and east, and noticing that Motor Age sometimes advises the Glidden tour route of last year, I am sending herewith a map of the Ayr Line connecting Des Moines with St. Joseph. You will notice this route is as near an air line as it is possible to make, and from this idea it derived the name of Ayr Line, as Mt. Ayr was one of the promoters of the route and worked hard for its improvement.

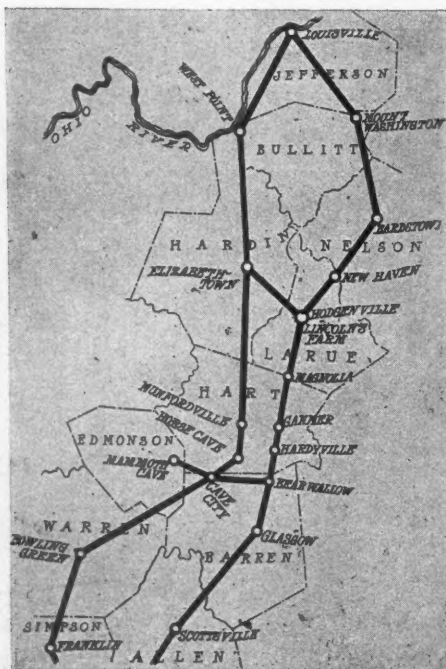
The Ayr Line passes through the famous Blue Grass region of northwest Missouri and southern Iowa, and while the route as an organization dates back to last

spring, the roads traversed have been kept in good condition for a number of years and only needed an organized effort to connect them into an ideal highway. Touring parties are using this line most every day and we find they are all much pleased with the road conditions, some of them saying they find the Ayr Line to be the best dirt road they have ever been over, not excepting the famous river-to-river road across Iowa, which we use for the first twenty miles out of Des Moines. We have the entire line blazed by painting the telephone poles, so there is no trouble in staying on the line, and signboards are now being prepared that will be placed as is usual on trails of this kind. Touring parties from the south and southwest have a choice of several lines out of Des Moines to Chicago, St. Paul and the north, while at St. Joseph you may find connecting lines to the west and southwest, so that the Ayr Line is destined to be one connecting link between Chicago and the great southwest. It is much shorter than the Glidden tour route.—J. T. Marrs.

TWO LINCOLN MEMORIAL HIGHWAYS

Elizabethtown, Ky.—Editor Motor Age—Motorists throughout the middle west are interested in the improvement of the Lincoln way and the Central Lincoln road in Kentucky. The accompanying map shows the routes which will be used, as they are the connecting links between north and south. The routes run almost parallel across the state to the Tennessee line, and each has loyal champions, who are working for the distinction of having their particular road indorsed by the government.

The Central Lincoln road will go through Buechel, Mt. Washington, Bardstons, New Haven, Buffalo, Glasgow and Scottsville. It will run 4 miles east of the Lincoln farm instead of through Hodgenville, as the map indicates, but a spur of the road will be built from Buffalo to the Lincoln memorial. Civil engineers are now at work on the road making drainage surveys, and expect to have them fully completed by July 31, when the citizens of the various counties through



THE TWO LINCOLN MEMORIAL HIGHWAYS THROUGH KENTUCKY, THE CENTRAL LINCOLN ROAD ON THE EAST AND THE LINCOLN WAY TO THE WEST OF THE OTHER

which the road will pass will turn out for what is to be known as good roads week.

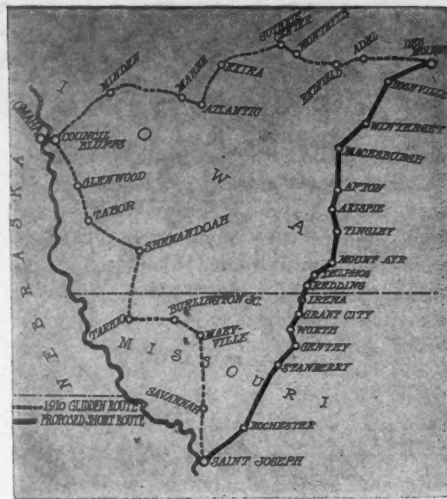
The Lincoln way, so designated by the state legislature at its last session, goes through West Point, Elizabethtown, Munfordville, Horse Cave, Cave City, Bowling Green and Frankfort. A branch road will be built from Elizabethtown to the Lincoln farm.—J. B. H.

ROCKFORD, ILL., TO MINNESOTA

Will Motor Age advise me through the Routes and Touring Information department as to the most direct route from Rockford, Ill., to Albert Lea, Minn? Any other information relative to the route will be appreciated.—Al. E. Henry.

Covering a distance of practically 308 miles, the most direct route as furnished by the Blue Book is as follows: Rockford to Dubuque via Freeport, Lena, Wadhams, Nora, Warren, Shullsburg, Wis., Benton, Hazel Green, East Dubuque, Dubuque, Ia. You will encounter some heavy hills on this portion of the route, the roads being mostly clay. Passing on from Dubuque towards Waterloo, motor through Centralia, Epworth, Farley, Dyersville, Earlville, Manchester, Independence, Jesep, Waterloo.

Leaving Waterloo for Albert Lea you have the choice of two routes, the distance being practically the same. The first choice is through Janesville, Shell Rock, Clarksville, Greene, Marble Rock, Rockford, Mason City, Manly, Kensett, Northwood, Glenville, Albert Lea. The second choice via Austin, Minn., passes through Janesville, Waverly, Erma Station, Plainfield, Nashua, Charles City, Osage, Mitchell, St. Ansgar, Lyle, Austin and Albert Lea. The roads on either route are over fairly good dirt roads.



THE AYR LINE ROUTE FROM DES MOINES TO ST. JOSEPH, MO. THE NEW SHORT ROUTE IS INDICATED BY SOLID LINE, WHILE THE ROUTE OF THE 1910 GLIDDEN TOUR IS SHOWN BY DOTTED LINE

For complete running directions and other valuable information such as hotel accommodations, garage facilities, etc., you are referred to the Blue Book, volume 4, 1911.

WANTS KANSAS CITY MAP

Nadeau, Kan.—Editor Motor Age—Will Motor Age through the Routes and Touring Information Department publish a route from Topeka, Kan., to Lamar, Barton county, Mo., via Kansas City, giving a map of the streets used in Kansas City on this trip?—Subscriber.

A distance of approximately 75 miles from Topeka to Kansas City the route lies through Leocompton, Lawrence, Eudora, DeSoto, Monticello, Zarah, Shawnee, Merriam, Rosedale, Kansas City. From

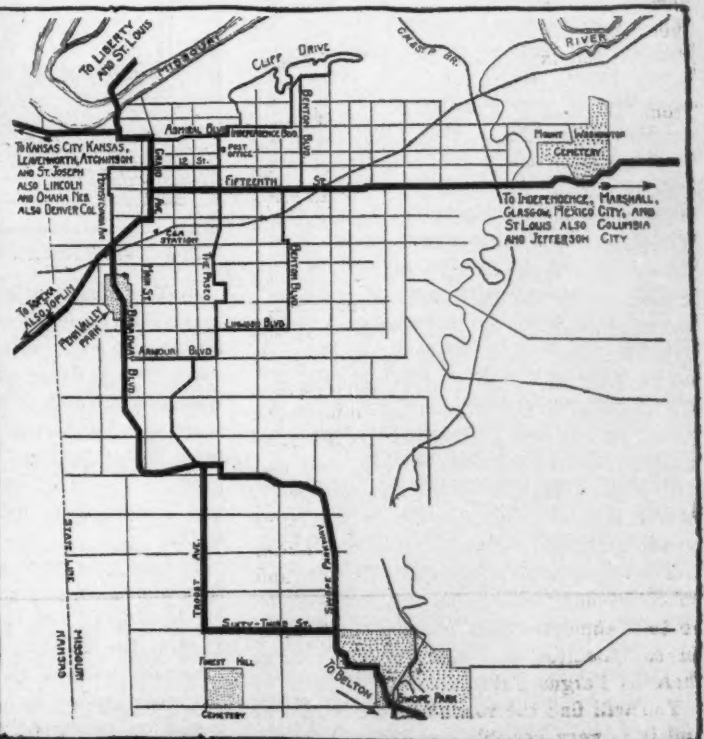
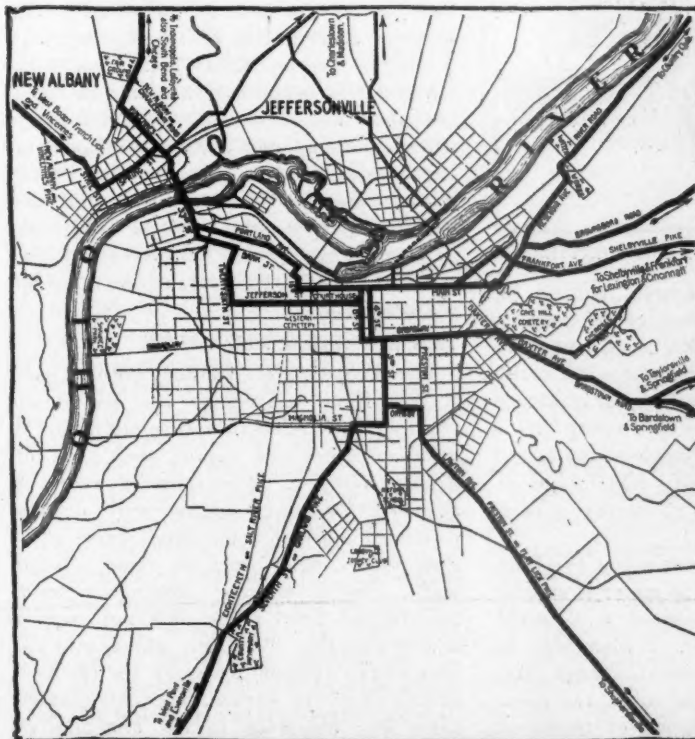
this point south to Lamar you will motor through Grand View, Belton, Harrisonville, Lone Tree, Adrian, Butler, Rich Hill, Wales, Nevada, Nassau, Milo, Sheldon, Irwin, Lamar.

On the latter half of the route the towns of Harrisonville and Nevada are large enough for night stops. You undoubtedly will find the roads from Kansas City to Lamar in fair condition at this season of the year, but in bad weather, especially in the spring, the roads are very heavy. For the accompanying map of the principal motor roads through Kansas City Motor Age is indebted to the Automobile Blue Book.

CINCINNATI-ST. LOUIS ROUTE

Cincinnati, O.—Editor Motor Age—Kindly give me the best route from Cincinnati, O., to St. Louis, Mo., via Vincennes, Ind., through southern Indiana and Illinois.—F. W. B.

Covering a distance of approximately 403 miles, according to the Blue Book, volume 4, the desired route is: Cincinnati, Cheviot, Miami Station, Harrison, Cedar Grove, Brookville, Blooming Grove, Connersville, Rushville, Arlington, Morristown, Carrollton, New Palestine, Indianapolis. From Indianapolis to Terre Haute, Ind., over the old national road, go through Plainfield, Mount Meridian, Manhattan, Rellsville, Brazil, Seeleysville, Terre Haute. From Terre Haute to St. Louis via Sullivan, Paxton, Carlisle, Bruceville, Vincennes, Lawrenceville, Olney, Noble, Flora, Salem, Carlyle, Trenton, Lebanon, Shiloh, Belleville, Edgemont, St. Louis. The route from Vincennes to St. Louis is not a much travelled route, but in good dry weather no difficulty will be experienced in making the run.



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TOURING ROUTES THROUGH LOUISVILLE, KY., AND ENVIRONS

MOTOR ROADS OUT OF KANSAS CITY, MO.

The Readers'

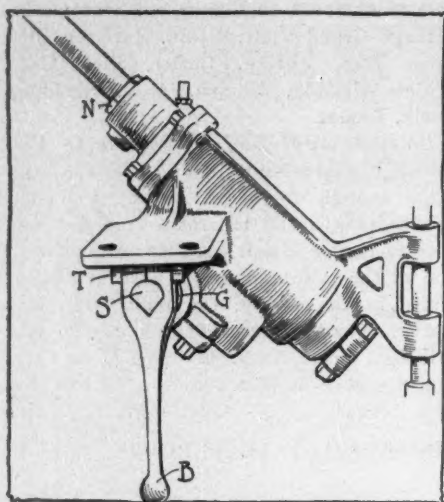


FIG. 1—BUICK STEERING GEAR

FORE-DOOR DASH VENTILATOR

COLUMBUS, O.—Editor Motor Age—Will Motor Age please tell me through the Readers' Clearing House how I can put an inexpensive ventilator on my fore-door Hudson 33?—A. C. Huston.

In Fig. 2 is shown the style of ventilator used on the Franklin fore-door cars and it is suggested that you might make one of similar design for your car. If your dash will permit, cut a hole in either side of it, cover the holes with fine copper wire screen on the outside and fit a little metal door with a catch on the inside, with perhaps a spring to hold it open.

LOOSE STEERING GEAR

Findlay, O.—Editor Motor Age—Through the Readers' Clearing House will Motor Age straighten me out on a 1910 model 10 Buick steering gear? I have too much play in the steering wheel gears. When I tighten the joint nut that goes into the top of the gearcase it takes a little of the play out but tightens up the wheel, so that I can hardly turn same. Is there any other way of removing this play?—A. E. C.

The nut N, Fig. 1, should be tightened as much as possible without in any way making the steering more difficult. To make the adjustment jack up the two front wheels so that any tendency of the steering mechanism to tighten up can be felt readily. The excessive play is more apt to be due to wear in the bushing G, or the steering arm may be loose on the shaft S. If the bushing is worn it must be replaced with a new one to remove the play; but the arm may be tightened on the shaft by drawing up on the clamping bolt T.

Much of your lost motion may be due to a little looseness in all of the various steering gear connections. There may be play where the ball end B of the steering arm fits into the socket of the connecting link; there also might be a little where the forward end of the connecting link is attached to the steering arm of the spindle, and there also might be play between the cross link and the other arms of the spindles. All of these must be adjusted and the lost motion removed. The ball joints of the

longitudinal steering link can be adjusted by removing the cotter pin and screwing in on the plug; while the cross link connections may require new pins. Improvement might even be obtained by disconnecting all joints and oiling them thoroughly, then adjusting them.

LARGER WHEELS SPEEDIER

Atalissa, Ia.—Editor Motor Age—Through the Readers' Clearing House will Motor Age answer the following questions:

1—Why did Burman use a 32 by 4-inch front wheel and 34 by 5-inch rear wheels when he broke the world's mile record at Daytona, Fla., April 24?

2—Does one get more speed using a small wheel instead of a large one, using the same horsepower?

3—Does it take more power to run a car through sand, using a large wheel, than a small wheel, the same sized car being used?—D. Brothie.

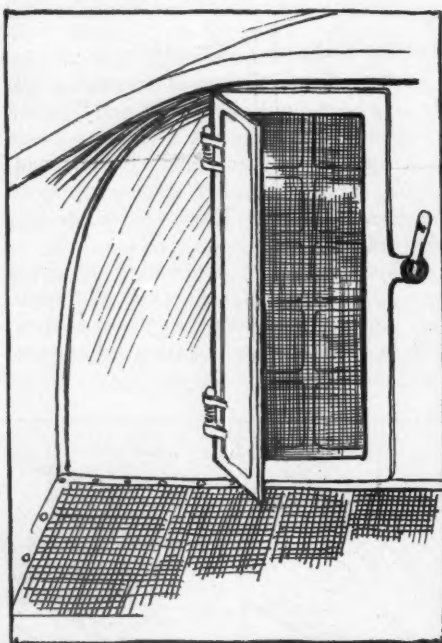


FIG. 2—FRANKLIN'S DASH VENTILATOR

1—The larger wheels were put on the rear to increase the speed of the car, the trial being made on a flat smooth straight-away with a flying start, where the motor was quite capable of reaching its maximum speed and delivering its full power with a little higher gearing, and where the lowest possible center of gravity was not essential because there were no curves to negotiate.

2—One gets more speed using the large rear wheels as long as the motor is capable of developing its full speed and power. Should the driving wheel diameters be increased to such an extent, though, that the motor would be overloaded, the speed would be decreased instead of increased, because the motor power and speed would be decreased. By using the smaller wheels

EDITOR'S NOTE—In this department Motor Age answers free of charge questions regarding motor problems, and invites the discussion of pertinent subjects. Correspondence is solicited from subscribers and others. All communications must be properly signed, and should the writer not wish his name to appear, he may use any nom de plume desired.

a quicker get-away can be made, which, of course, is an important speed factor in short races; they also are an advantage in circular dirt track racing in that they lower the center of gravity and enable the driver to go faster without overturning.

3—No; a car with large wheels can be driven through sand by less power than is required to drive a similar sized car with smaller wheels. This is because the larger wheel does not sink so deeply into the sand and rolls through it easier.

END PLAY IN MOTOR

Rock Rapids, Ia.—Editor Motor Age—Through the Readers' Clearing House will Motor Age answer the following questions:

1—What difference should there be in the size of the cylinder and piston. Is a difference of 5/1,000 of an inch too much?

2—How should the end play of an E-M-F motor be taken up?—U. E. R.

1—A difference of 5/1,000 of an inch is just about right.

2—The end play of the E-M-F motor can be taken up temporarily as shown in Fig. 3, by drawing out the end of the bearing bushing B with a drift and hammer till it takes the shape indicated by the dotted lines, thereby reducing the space between the bushing and the flywheel F. The job may be a little laborious, owing to the inaccessibility of the bushing, but it can be accomplished. Care should be taken not to pound too hard, and in using the drift and hammer one should keep working around and around the flange of the bushing so as to spread it out evenly all around. To do a first class job, the proper way to make a more permanent repair would be to renew the bushing, which of course would require the taking out of the crankshaft.

THE MANIFOLD AIR VALVE

Los Angeles, Cal.—Editor Motor Age—A few facts relative to the use of an auxiliary air inlet in the manifold of a gasoline motor car engine should be of general interest. A carburetor which is adjusted for heavy engine work of any character must of a necessity waste gasoline where light work is done. Light work, such as ordinary driving on hard, smooth and level roads does not require a rich mixture. Whatever gasoline in excess of the amount necessary for the particular work is burned, not only constitutes loss but adds to the difficulty of keeping the engine clean.

An auxiliary air inlet in the intake

Clearing House

EDITOR'S NOTE—To the Readers of the Clearing House columns: Motor Age insists on having bona fide signatures to all communications published in this department. It has been discovered that the proper signature has not been given on many communications, and Motor Age will not publish such communications, and will take steps to hunt down the offenders of this rule if it is violated.

manifold permits of greater speed under normal conditions, and in general protects results in a greater mileage per gallon of gasoline. In addition to this the auxiliary air inlet can be used to test the carbureter adjustment under any given circumstances. This function is of prime importance to the average car user. The test suggested is made by the manipulation of the auxiliary air intake valve. If the mixture is too rich for the conditions under which the test is made, the admission of pure air into the manifold will add power and snap to the engine. If the mixture is too thin the addition of more air will cause a sputtering and loss of power great enough to detect instantly.

The general fault lies in the use of too rich a mixture for ordinary work. Such a mixture may be used in connection with the auxiliary air intake without waste where less power is needed. In other words, the auxiliary air intake permits of a carbureter adjustment which will provide a good mixture for extreme uses and starting, and still serve the purpose without waste and without change for light work other than the regulation of the auxiliary air valve itself, which can be done from the seat.

The auxiliary air intake accomplishes the results described in the most obvious manner. The opening in the manifold above the carbureter relieves the vacuum caused by the suction stroke of the piston by exactly the amount of air admitted, and relieves the carbureter of a certain proportion of its duty, except under maximum performance, as explained later. This action accounts for the ability of the engine to take in a fuller compression charge when traveling at very high speed and in high altitudes, as well as for the saving of gasoline under light work.

The necessity of more air for high speed and high-altitude work probably is due to much the same cause—that is, the inability of the engine to suck in on the intake stroke either a sufficient volume for full compression or a sufficient number of air elements for a perfect mixture.

In both cases the charge of air taken in is more rarefied than would be the case under normal conditions. In high altitudes this is due to thin air and low atmospheric pressure, whereas in high-speed work the difficulty lies in the mechanical impossibility of drawing the greatly increased volume of air necessary through the fixed intake aperture of the carbureter.

It is safe to assume, in either case, that the suction stroke gets practically all the gasoline vapor possible with a given opening of the needle valve, because in both instances the admission of pure air into the manifold above the carbureter will give a more vigorous stroke. The gain obtained by the admission of a stream of foreign air above the carbureter probably is due to three causes: First, greater degree of compression in the cylinder due to larger volume admitted; second, a more perfectly proportioned mixture, due to greater number of air elements admitted, and, third, a more thoroughly mixed charge, due to the mechanical mixing effect of the inrushing air. This is of vital importance, because a quick and complete combustion of the gases depends very materially upon their physical condition as to coalescence.

Its action as a truly mechanical mix-

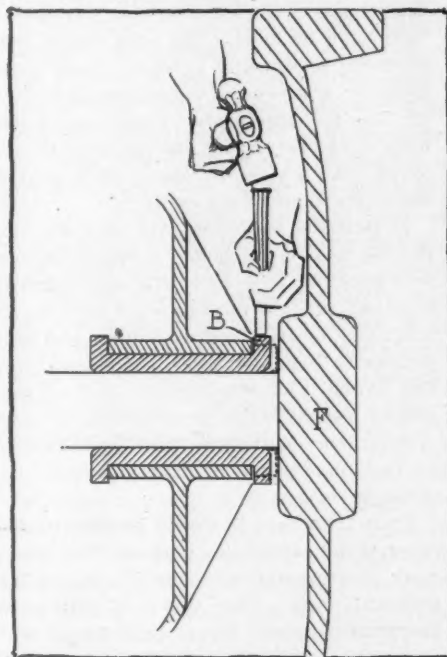


FIG. 3—ELIMINATING END PLAY

ture is a very important function of the auxiliary air inlet. The jet of inrushing air may be said to act as a flail in stirring and thoroughly mixing the gases during their passage through the manifold.—C. V. B.

DESCRIBES ACTION OF CONDENSER

Winlock, Wash.—Editor Motor Age—I get Motor Age every week and I like it very much, especially the Readers' Clearing House, but in the issue for May 4, page 22, in answer to M. V. P., I think a mistake was made in the explanation of the action of the condenser. The condenser is wired in the system between the contact points, as Motor Age stated, and when the contact is broken the static charge is stored in the condenser, but instead of waiting until the contact is again

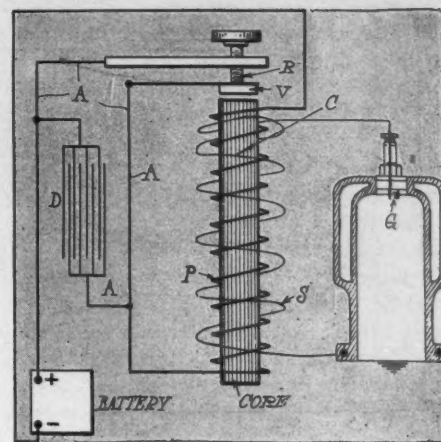


FIG. 4—SHOWING CONDENSER CONNECTIONS

made, and flowing through the primary winding with the battery current, as Motor Age says, this static charge as soon as it is stored in the condenser immediately flows back through the battery and primary winding in the opposite direction from the battery current, demagnetizing the core, which increases enormously the efficiency of the coil, as the demagnetizing of the core sets up as many lines of force as the magnetizing does, this being the theory of the step-up transformer.

As proof that it could not act as Motor Age says, I might say that were the condenser to hold the charge until contact was made again it would simply short-circuit itself through the wires A and across the contact points, as I have marked in the drawing, as there is less resistance in going through the closed contact points than there is in going through the battery and primary winding.—Kenneth D. McKay.

LOOK FOR CARBON

Kimball, Kan.—Editor Motor Age—Through the Readers' Clearing House will Motor Age inform me what is the trouble with my 1910 two-cylinder Reo car? I had a repairman tighten the connecting rods; when we started the car it was hard to start; runs good for about 5 miles and then begins to knock and is worse than it was before we worked on it.—Reader.

Your trouble evidently is due to a carbon deposit on the cylinder and piston heads of your motor and not too loose bearings. A knock caused by loose bearings would begin as soon as you began to subject your motor to a hard pull, and would not require a run of 5 miles to develop. If, however, you should find that the knocking can be made to occur immediately upon starting the motor by running it up a hill, or incline, on the high gear, then it is possible that the bearings are loose again, and that they do not remain tight because of a bent crankshaft, or because they were not properly scraped or tightened. If, on the other hand, the knocking cannot be made to occur until the motor has been running for some time, the trouble is due to carbon deposits, which prevent the proper radiation of heat through the cylinder walls, become incandescent, and cause pre-ignition

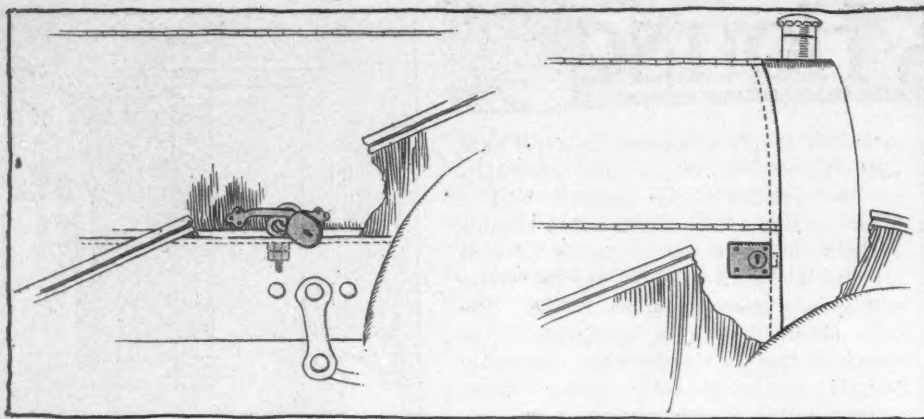


FIG. 5—TWO WAYS IN WHICH HOOD MAY BE LOCKED

of the incoming gases, thus giving rise to the knocking that takes place as soon as the motor becomes thoroughly warmed up. The carbon must be removed to eliminate the trouble, and the sooner the better. The carbon may be removed either by means of some of the compounds or devices now on the market or by removing the cylinders and scraping it out of the heads and valve chambers and off the piston heads.

ENDORSES SOUTHER'S SPEECH

Emporia, Kans.—Editor Motor Age—The writer has been a constant reader of Motor Age almost from its infancy. While I have not been in any way directly associated in construction or otherwise, but indirectly have given the subject of motor car work very close observation from a mechanical as well as a maintenance point of view. In Motor Age, issue June 22, I am much impressed with the expression made by President Henry Souther, in his message to the Society Automobile Engineers at Dayton, Ohio.

Presenting myself to Motor Age, not associated in motor car work, readers of the paper probably may be interested in anything I might say on what I believe is vital in the best interests of the great work before this association, as well as of great interest to touring car owners and their prospective purchasers of motor cars.

The last paragraph of President Souther's message is the key to the situation, the vital question in the progress and development of this great work which now is in its infancy. No other part of industrial development has shown such progress as that of dirt road transportation, and no other influence in human welfare is as vital as that exerted by motor car manufacturers and users.

In connection with this progress and development, because of its radical character and great extent, the development of men for this great work has been allowed to take care of itself until it must be said that the most vital problem of today is that of men qualified for the work. The engineering and supervision of operation in the manufacture are in advance of its men, and in many ways the problem has outgrown the individual and methods of dealing with the

individual, and especially has it outstripped methods for preparing men for the work.

These suggestions are prompted by a desire to present a passable, simple, and consistent solution of the problem of the men for the future.

A pyramid is typical of what is needed. The pyramids have outlived centuries, but they could not if they were not planted on their bases. Our touring car pyramid is resting on its apex. The plan begins with a careful selection of recruits. This is followed by a scheme of education carried out by the manufacturers themselves, beginning at the recruiting and consistently followed with a view of raising each individual to the limit of his capacity.

It is based upon the rank and file—the results looked for being a broad base of well-qualified men who will apply knowledge and thought to their work with an appreciation of their responsibilities and obligations to their employer, their associates, the public, and themselves. Subordinate official responsibility to meet need of leadership talent in the strenuous operation up to the standard of efficiency largely depends on success.

From the above it should be easy to discover those capable to organize this great work for greater economy in assembling standard parts. The system of putting in operation methods for a more simple performance soon takes root with patrons and the touring or business car becomes more popular in the interest of commercial welfare and greater efficiency in time and workmanship, thus increasing the output.

These are the views of a careful observer in all the different operations and noted on visiting a large majority of our large manufacturing plants and are viewed only from a mechanical point.

The other side is well explained in an address by Hugh Chalmers, president of the Chalmers Motor Co. of Detroit, before the Parker, Davis & Co. good fellowship club at their luncheon, May 28, 1910, and applies to the mechanic, his supervisor, as well as the salesman.

In conclusion, I just want to say A. D. Carpenter's kicks, under the heading of "Parts at Sane Prices" is a kick very mild in form. A cleaning of spark plug at the \$5 rate to tourists towards the west

is a sample of a great need of some method to prevent robbery.

Should not motor car owners from coast to coast organize against such conditions, and take into the organization fair and honorable dealing garage owners? Could not such an organization regulate parts, and supplies at fair prices? If there is any reason why this cannot be done I should be pleased to have you inform me. I believe if such an organization could be made it would stimulate buyers—present conditions discourage the buyer.—F. H. Ogden.

LOCKING THE BONNET

Craik, Sask., Canada—Editor Motor Age—Through the Readers' Clearing House columns could Motor Age inform me of any neat, simple and reliable means of locking the engine hood to prevent mischief-makers meddling with the adjustments of the engine? Of course, there is always the old idea of a leather strap and lock buckle, but this is unsightly. I have an idea I saw something in the shape of a locking snap for holding the hood down somewhere, but cannot exactly locate the makers. Any help and advice would be appreciated.—Inquirer.

The Pierce-Arrow cars have a very neat Yale lock fitted to the front vertical edge of their hoods, as illustrated at the right in Fig. 5; and it is suggested that you might have locks of a similar nature fitted into your hood. There is a lock at the forward edge on either side of the car. The bolts of the locks are designed to catch behind the frame on the rear of the radiator which supports the front end of the hood. An even simpler method would be to drill a small hole opposite the handle of the hood down through the top horizontal portion of the frame on either side of the car, then secure eye-bolts in these holes and use an ordinary little padlock to lock the handle to the eye-bolt as shown at the left in Fig. 5.

NOISE ON LOW GEARS

Newberry, S. C.—Editor Motor Age—Will Motor Age kindly answer the following questions through the Readers' Clearing House columns?

1—Why is it that the motor makes a great deal of noise when running light, and with the low on, but as soon as it is thrown into high, it can hardly be heard at all? This has always been a puzzle to me, and I have been waiting for some other ignoramus to ask the question, but as no one has so far as I know, I am forced to do so for my own as well as the satisfaction of all the other aforesaid non compos mentis. My reasons for not being able to see the whyfor is, that throwing in the gears, does not in any way change the work of the motor, hence why should it change the sound of its work?

2—Will Motor Age also tell me why it is that when a storage battery has been used until the voltage registers less than the rated voltage that the makers call for, that it ruins it? Also what will restore

it? It certainly ought not to be damaged past redemption.—Dr. Meldau.

1—One reason why a motor makes a noise when running light or idle, is because it runs at a considerably higher rate of speed than when running under load. The same applies when the motor is pulling a car on the low gear. The motor runs very much faster than when the high gear is thrown in, and in addition to the noise of the engine there is the grinding or whirling noise of the gears. When the high gear is thrown into mesh, the drive through the change-gear box is direct by means of a positive clutch, or through a pair of small gears which turn at a relatively low rate of speed, therefore the noise is greatly reduced. The changing of gears certainly does make a change in the work that the motor is called upon to do. A motor can work faster and easier and with more power on the low gear than on the high gear.

2—To discharge a battery beyond the limit set by the manufacturer will not necessarily ruin it. Unless a practice is made of discharging the battery down below the safe limit recommended, a battery can be quite fully restored by recharging it fully at a slow rate. When a battery is over-discharged the plates become sulphated and the usual method of removing the sulphate is to charge the battery a long time, a week if necessary, at a 2 or 3 ampere rate. If this does not bring about the desired results, however, the battery is practically beyond redemption and a new battery or at least a new set of plates is required.

TIRES AND SPEED

Kansas City, Mo.—Editor Motor Age—We have an Everett 30 which is equipped by the factory with 34 by $3\frac{1}{2}$ -inch tires. I have had an argument as to whether this car, without mechanical changes, would give more speed on a level track with the regular equipment of tires or 35 by 4-inch tires. I argued that by putting on the larger tires I would increase the speed on a level track but that it might decrease the power on hills. Am I right or wrong? I think that by changing these tires and putting on 35 by 4-inch I increase my speed on cars which are geared higher than the ratio of their transmission. For example: If I had not changed these tires it would have been necessary to change the ratio of the transmission from $3\frac{1}{2}$ to 1 to a 3 to 1 in order to secure the same results.—Victor Warner.

It is quite probable that your motor will have sufficient extra power to give the car greater speed on a level track, as you say, by enlarging the size of the tires; the change from a 34 by $3\frac{1}{2}$ -inch tire to 35 by 4-inch tires, however, is not necessarily equivalent to a change in gear ratio of from $3\frac{1}{2}$ to 1 to 3 to 1. The 34-inch tire is about 107 inches in circumference, the 35-inch tire is about 110 inches in circumference, therefore there would be a gain in car speed of about 3 inches of road travel,

providing the motor speed is constant. With a 3 to 1 driving gear ratio, however, which means that the wheels make three revolutions for every one of the motor, if the same motor speed could be maintained for both ratios, the wheels would make a half revolution more for every revolution of the motor than with the $3\frac{1}{2}$ to 1 gear, which would be equivalent to an increase of about 43 inches road travel per revolution of the motor.

PROBABLY DIRT IN TANK

Goodland, Ind.—Editor Motor Age—Will Motor Age kindly tell me what is the trouble with my model I Maxwell. It will run about 10 miles or so then one cylinder will drop out, then the rest will drop out, one at a time, then stop. Sometimes it will pick up and run all right and maybe it will stop dead the next time. It seems to have plenty of spark and plenty of gasoline. The gasoline seems to be free from water. After the machine stands for a while it will run all right. It seems to have plenty of power and speed when running. I would like information as soon as possible.—Fern Harms.

The symptoms of your trouble indicate that there is sediment in the settling chamber of your carburetor or in the gasoline line or tank. This causes the flow of gasoline into the carburetor to be so restricted at times that the motor is choked, so to speak, as described. There is a screw plug at the bottom of the carburetor; turn off the gasoline at the tank, remove this plug and allow about half a teacup of gasoline to run out. At the same time push down the float stem, allowing the gasoline in the float chamber to run out also, as this will draw out any water or sediment that may have gotten past the float valve.

VALVES TIMED WRONG

Bryan, O.—Editor Motor Age—I have been working with a Flanders 20 car and am unable to locate the trouble. I am unable to get a spark into the cylinders. The batteries are good and I think the coils are all right, but it does not seem to go through the magneto. When I crank the engine it kicks and cracks as loud as the report of a shotgun. This does not occur every time, for I can turn the motor over four or five times, let it stand a while, and then turn it over again, when it will crack and smoke will fly from the carburetor, run backwards a couple of times, then stop. I have done everything I could think of but have not overcome the difficulty.—Marvin Warner.

Your trouble apparently is due either to improperly timed valves, or to incorrect ignition timing. If the motor has been disassembled so that the valve-timing gears may have been improperly meshed, it will be necessary to remesh them according to

the marks upon their rims; it being required that the marks come together, or that the mark on the side of a tooth of one gear be directly opposite a similar mark on the rim between two teeth of the other gear. If the motor has not been disassembled, your trouble is most likely caused by improperly connected wires. The firing order of the engine can be learned by watching the order in which either the inlet or exhaust valves operate, and the order in which a spark is diverted to the different high-tension cables that lead to the plugs can be learned by removing the distributor cover from the magneto and watching the movement of the distributor while the car is being cranked.

Having learned the direction of rotation of the distributor segment of the magneto, crank the motor till the segment is opposite the stationary segment to which the No. 1 cable is attached, that is, the cable leading to No. 1 cylinder. Then crank the motor a little further till the revolving segment is opposite the next stationary segment, and see if the cable of this cylinder is attached to the spark plug in the cylinder which is next to fire. To learn which cylinder is on its firing center, use the following rule: When an exhaust valve is open, the following cylinder is on its firing center.

For example, if the valves show that the motor fires 1-3-4-2, and No. 1 exhaust valve is open, then No. 3 cylinder, the third from the front, is on its firing center; and if No. 2 exhaust valve was open, then No. 1 cylinder would be ready to fire, that is, the piston would be ready to descend on its firing stroke. If it is found that neither of these are the causes of your trouble, look for leaky inlet valves, a broken inlet valve stem, or a carburetor adjustment by which too much air is admitted into the mixture.

BROKEN CONNECTION, PROBABLY

Fort Smith, Ark.—Editor Motor Age—Through the Readers' Clearing House will Motor Age kindly answer the following:

We have an E-M-F car which stopped on the street. We cranked it but it would not start. The batteries are new, still it would not run only when we made a make-and-break at the switch. We put on a new breaker-box, then took the coil, magneto and wires off of a car that was running all right, but still nothing doing. The engine has good compression and has never been worked on before, for it is a new one. Can Motor Age tell us what is the trouble?—Reader.

Your trouble undoubtedly is due to a loose or broken switch connection. By removing the switch cover the switch connections can readily be examined and repaired.



Stearns Uses Knight Motor

Sleeve-Valve Motor Invented by Charles Y. Knight Will be Used Exclusively for the Season of 1912 by the Cleveland Concern

Poppet-Valve Type of Motor Entirely Discarded

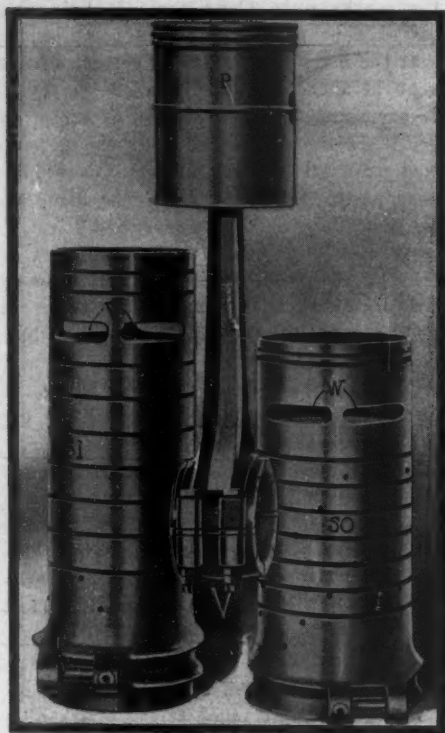


Fig. 1—Two Sleeves and Piston in the Stearns-Knight Motor for 1912

THE Stearns company has adopted the Knight slide-valve motor exclusively for its 1912 model.

For more than 2 years rumors have been afloat continually as to who would be the first to bring out the Knight design of sleeve valve in this country and very general have been the speculations. These rumors can now rest, as the F. B. Stearns Co. has announced out and out that it will not build anything else for next year.

Few expected such a clean-cut policy with reference to the introduction of this American-designed motor, which had to be taken to Europe and accepted by four of the leading concerns there before an American motor car engineer would even consent to consider it. It made good in England, in Germany, in France, in Belgium and in Austria and now it has started on its journey in America.

Matter Long Considered

In accepting this sleeve-valve design the Stearns people have not gone into the matter in a half-hearted manner or on the spur of the moment. The Stearns engineers have been exploiting this motor for more than 2 years. They went abroad with the aim of discovering all the faults and shortcomings they could in the Daimler, the Panhard, the Mercedes and the Minerva, and they came home ready to toss the poppet-valve type of motor overboard entirely, cutting all bridges behind them and using nothing but the Knight type.

After this decision the company built its sleeve-valve motors and tested them out for weeks and months in trips over the Alleghanies and other mountain roads. Every detail was gone into, everything was done to test or break the motor and

now the company is satisfied, it is ready to pin its life to the slide valve, as designed by Charles Y. Knight, of Chicago, and adapted to Stearns conditions by Factory Engineer Sterling.

Those who have closely followed the trend of motor evolution during the last few years are familiar with the Knight sleeve-valve motor, and for those who have not the next few paragraphs are specially intended; to the expert they may prove a trifle elementary.

Figs. 1 and 2 on this page tell the story of the slide-valve Knight motor: The pair of cylinders illustrated in Fig. 2 have not any offset chamber at the left or right to contain valves as in the T or L-head cylinder types. There is not a mushroom or poppet valve. Instead there are two sleeves, Fig. 1, which fit between the cylinder walls and the piston. One sleeve goes inside of the other in a telescopic fashion, then both sleeves go inside the cylinder and lastly the piston goes inside of the inner sleeve. Instead of just a piston reciprocating or moving up and down inside the cylinder there are two sleeves, making three moving elements in all. These two sleeves take the place of the poppet valves. How they do it is briefly as follows:

Operation of the Sleeves

As Fig. 1 shows, the inner sleeve SI has two slots V cut in its upper end; the outer sleeve SO has similar slots W in its upper end; and in the side of each cylinder is a similar slot WI, Fig. 2. Supposing the intake pipe from the carbureter attaches to the cylinder castings at WI, then the explosive mixture only can get into the combustion chamber when the slots V and W on the two sleeves are opposite with the slots WI in the cylinder. These slots get in this position at the proper time so that when the piston is going down on the suction or aspiration stroke the gases from the carbureter have a free passage to the inside of the cylinder.

On the opposite sides of the sleeves SI and SO are similar slots to serve as exhaust valves and on the opposite sides of the cylinders, Fig. 2, are exhaust slots, the positions of the exhaust slots being different from those for the intake, so that at the proper time these exhaust slots or ports open and let the hot products of combustion escape. This, in a word, is the Knight sleeve-valve motor, the sleeves and parts illustrated herewith being those used

in the Stearns car. At the right end of Fig. 3 the two sleeves or valves are shown inside of each just as if ready to be slipped into the cylinder.

But these two sleeves must be moved up and down in order to open and close properly for the intake and exhaust. This is done by what is known as an eccentric shaft which takes the place of the camshaft in the poppet-valve motor. Only one eccentric shaft is used. It reciprocates both sleeves. It is carried inside of the crankcase and resembles a miniature crankshaft. Two short connecting rods couple it with the sleeves for each cylinder, one connecting rod for the inner sleeve and the other for the outer sleeve. These rods are marked RI and RO in Fig. 3 and are shown in position on the base of the sleeves.

Silent Chain Is Used

This eccentric shaft is not driven by gears, as is the camshaft in the poppet-valve motor, but, as Fig. 4 illustrates, a Coventry silent chain is used to convey the power from the gear on the crankshaft to the larger gear GI on the end of the eccentric shaft. This illustration also shows a similar chain driving from the crankshaft towards the right; it drives the pump and magneto shaft on the left side of the motor.

The use of silent chains for this work took hold in England 2 years ago because it was quieter than using gears and the

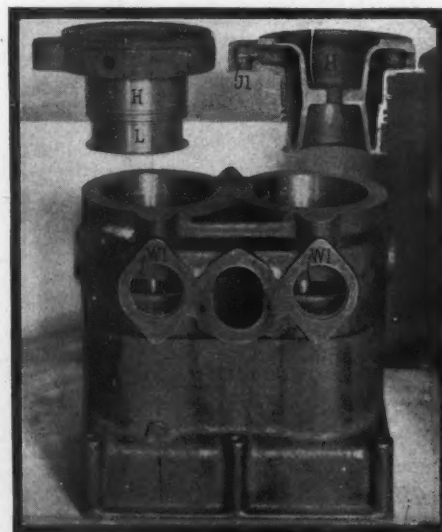


Fig. 2—One Pair of Stearns-Knight Cylinder Castings and Cylinder Heads Removed and One Head Shown in Section Illustrating How the Heads Are Completely Water-jacketed

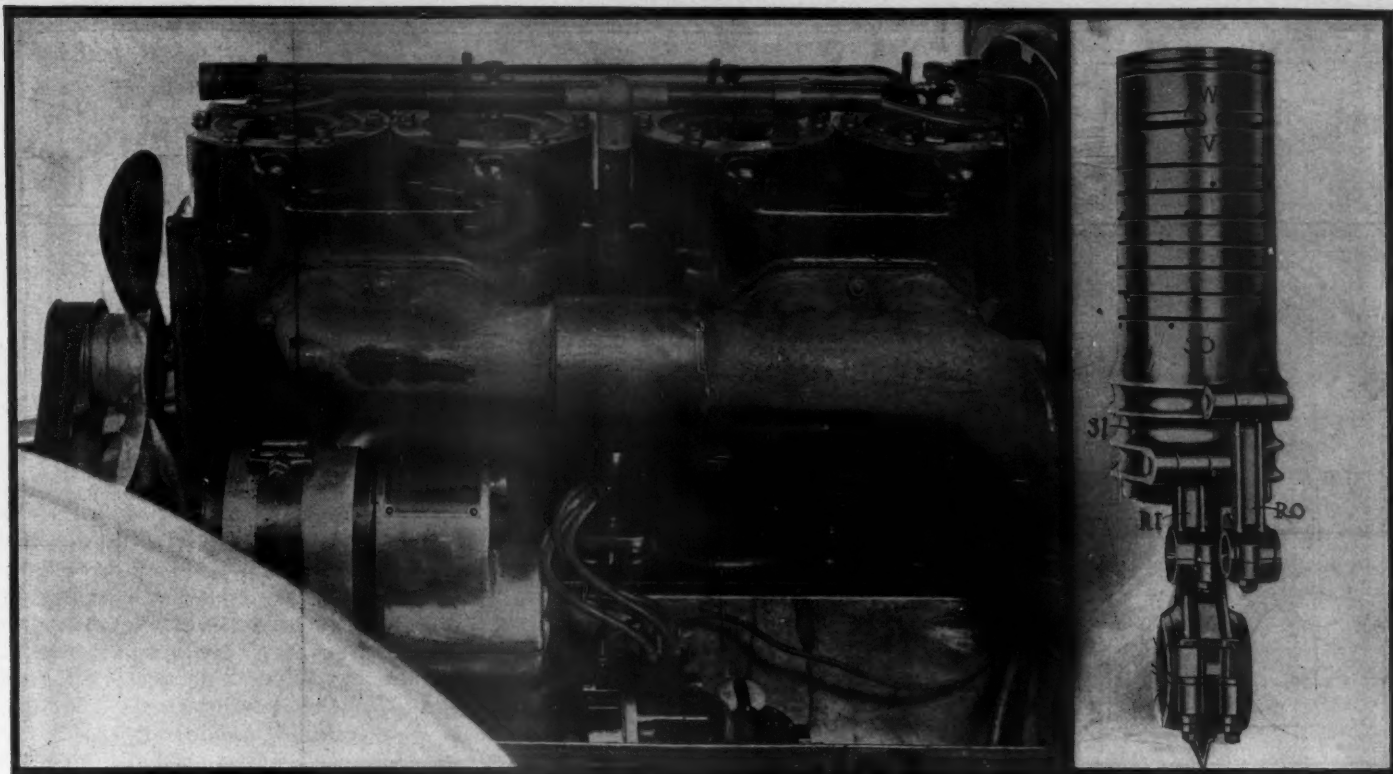


Fig. 3—The exhaust side of the Stearns-Knight 38-horsepower sleeve-valve motor for 1912. Two magnetos are shown, the Mea to the right for the regular ignition and the other one located above the water pump is for the electric light system on the car. At the right are the two sleeves inside each other and ready to be put in a cylinder. The piston is inside of the two sleeves

results as good. Today the silent chain is used on scores of foreign cars to drive the camshafts and not a few American builders will use it on their 1912 cars. The Daimler company, in England, the first concern to adopt the Knight motor, was the first also to make use of the silent chain in this respect.

These sliding sleeves or valves are not thin like pieces of stove pipe, but are $\frac{3}{4}$ inch thick each. They are gray iron castings, machined and ground to size inside and out so that they are a perfect fit between the cylinder walls and the pistons. The inner sleeve is the longer, the outer one shorter, being cut away at the lower end to allow for the operation of the inner sleeve. These sleeves are grooved circularly on their outer surfaces in order to distribute the oil evenly over the surface and towards the lower ends holes are drilled through them to allow for the passage of the oil.

The intake and exhaust ports in these sleeves are not the same size. The Stearns motor has cylinders with $4\frac{1}{4}$ -inch bore and $5\frac{1}{2}$ -inch stroke, having an S. A. E. rating of 38.9-horsepower and for this size the intake port is $\frac{1}{2}$ inch deep and extends 124 degrees around the sleeve, this being slightly more than one-third of the circumference. This is practically equal to a rectangle 4.5 inches long and $\frac{1}{2}$ inch wide. The exhaust port is a little larger, being $\frac{5}{8}$ inch high and the same circular length as the intake.

Problem of the Sleeve Valves

The big problem with sleeve valves of this nature is to get the proper position of the slot or ports for both intakes and

exhausts. In Fig. 7 the relative location of these ports in both sleeves is shown. This illustration is a vertical section of a cylinder as seen from the driver's seat. The mixture enters through the port or slot X and the exhaust escapes through the opposite slot XI. Roughly speaking, these are on the same level, the exhaust being a little the larger. The inner sleeve SI has its intake slot and its exhaust slot just above the opening X, so that, as illustrated, the intake valve is closed. These sleeves have exhaust slots on the left side for registering with the opening XI. As illustrated, the outer sleeve slot partly registers with XI, but the slot on the inner sleeve is well above XI, so that the exhaust valve also is closed.

The intake slot in the outer sleeve is higher than that in the inner sleeve; but the reverse is the case with reference to the exhaust slots; that on the inner sleeve is the higher. Then, too, the exhaust slots are both a little higher up than the intake slots. But these differences of location are not enough to accomplish the correct opening and closing of the ports for intake and exhaust. One sleeve is set 70 degrees ahead of the other so that generally a port is opened by one sleeve going up to bring its slot into register and the other coming down to get into register. This gives a very rapid opening of the ports or slots, which is highly desirable, and it also allows of them remaining wide open for a certain length of time when the connecting rod for the sleeve is at the top or bottom of the stroke, the point of least vertical movement for the sleeve, in fact the point where the sleeve remains sta-

tionary for a considerable length of time.

It is interesting to watch an intake or exhaust port open and close and note how it is done. Fig. 5 illustrates how this is done. In part 1 an inlet port X is ready to open. W marks the port in the outer sleeve and V the port in the inner sleeve. At the start the outer sleeve lowers very rapidly, the inner one remaining almost stationary, the slot V being already in the necessary position. The closing is accomplished by the inner sleeve rising. The intake is open more or less for 220 degrees

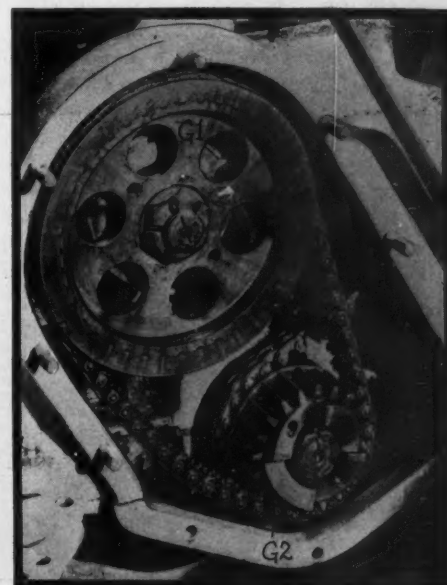


Fig. 4—Two silent chains are used on the Stearns-Knight motor; one chain drives the eccentric shaft from the front end of the crankshaft and the other chain drives the shaft carrying the water pump and magneto.

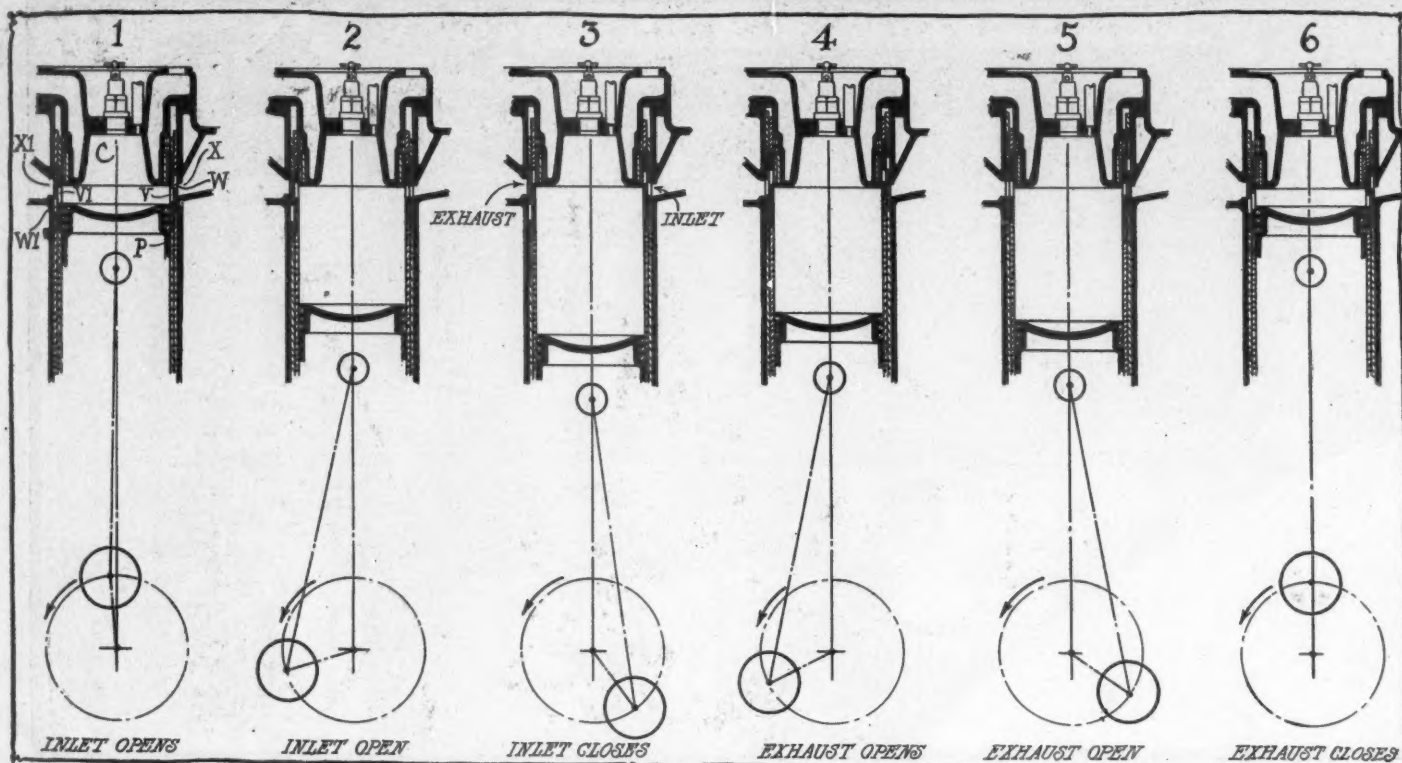


FIG. 5. DIAGRAM ILLUSTRATING SLEEVE-VALVE ACTION OF STEARNS-KNIGHT MOTOR

The parts are: P, Piston; C, Combustion Chamber; X, Intake Port; XI, Exhaust Port; W, Intake Port in Outer Sleeve; V, Intake Port in Inner Sleeve; WI, Exhaust Port in Outer Sleeve; VI, Exhaust Port in Inner Sleeve. The six illustrations show the intake port opening and closing and also the exhaust opening and closing. When the intake opens the outer sleeve lowers very rapidly, the inner sleeve remaining stationary. The intake closes by the inner sleeve rising. The exhaust port opens by the inner sleeve lowering before the outer one starts moving and then both lower together. The exhaust port is closed by the outer sleeve lowering. On the explosion stroke the inner sleeve descends rapidly with the piston at the start, and this is followed by the outer sleeve lowering. On the compressive stroke both sleeves rise with the piston, though slower.

on the crankshaft; 180 degrees represent one-half of a revolution, so the valve is open for considerably more than one-half a revolution, that is, from the top dead center to 40 degrees past the bottom dead center.

This valve does not open and close progressively, that is, with the same degree of speed from start to finish. It gets 50 per cent of its opening in the first 20 per cent of the time it has to open and close. Then it remains at the point of maximum opening for 15 degrees and has a progressional closing. In poppet-valve motors the aim is to get the valve open as quickly as possible and hold it open as long as possible in order to get sufficient mixture in, in case of the intake, and also in order to get the exhaust gases out. The same thing is aimed at in these sleeves and it is accomplished by the relationship of one sleeve to the other.

Part 2 in Fig. 5 shows the intake wide open and the exhaust closed. The exhaust port on the inner sleeve is opposite the cylinder opening, but the slot on the outer sleeve is well below the opening. This explains the necessity for two sleeves, in order to get proper opening and closing.

When the exhaust valve opens, parts 4 and 5 in Fig. 5, the inner sleeve lowers, the outer sleeve remaining stationary. The outer sleeve is in the necessary position at the time the opening starts. After the

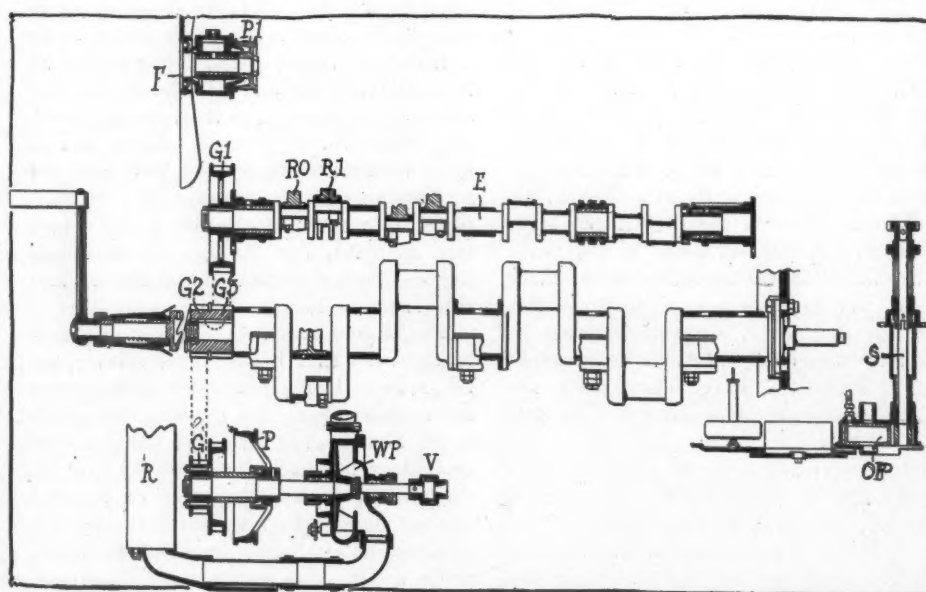


FIG. 6. MOTOR DRIVE SHAFTS ON STEARNS-KNIGHT MOTOR

The crankshaft is carried on five bearings, all $2\frac{1}{2}$ inches in diameter, the rear one 5 inches long, the front one $2\frac{1}{2}$ inches, the center one 3 inches and the two short bearings between the first and second and third and fourth cylinders 2 inches long each. On the front end of the crankshaft are two gears, G2 and G3. Gear G2 drives through a silent chain and gear G, the shaft carrying the pump WP, which couples through a universal V with the magneto shaft. On this shaft is a pulley P to drive the fan. Gear G3 drives to gear G1 on the eccentric shaft E. The connecting rods R0 and R1 are shown in place on the eccentric shaft. The fan F is carried on plain bearings being driven by belt from pulley P to pulley P1. The oil pump OP is driven through the vertical shaft S. It is located in the base of the crankcase.

inner sleeve has lowered to the open position both inner and outer sleeves descend together and the closing is accomplished by the outer sleeve coming down.

A Valuable Feature

One of the most valuable features in connection with the movement of these sleeves is that at important times they move in the same direction as the piston. For example: On the explosion stroke the inner sleeve comes down rapidly at the start, and the outer sleeve descends a little slower. Towards the end of the explosion stroke the inner sleeve slows up and the downward movement of the outer sleeve quickens. It is valuable to have the sleeves descend with the piston on the explosion stroke, because this is the working stroke and the stroke in which the piston has the maximum side thrust against the sleeve, or in the case of a poppet-valve motor against the cylinder wall. Although the piston has a down stroke of $5\frac{1}{2}$ inches it is scarcely this so far as its friction is concerned, because the sleeve moves down $1\frac{1}{8}$ inches. This facilitates the lubrication and reduces the wear on the side of the sleeve. On the compression stroke both inner and outer sleeve go up with the piston, the inner sleeve moving the faster. On the exhaust and aspiration strokes the sleeves move in the opposite direction to the piston, but on these strokes there is little work being done by the piston and the side thrust is at a minimum.

The up-and-down movement of the sleeves is very short as compared with that of the piston. In the Stearns motor the piston stroke of $5\frac{1}{2}$ inches gives a piston speed of 916 feet per minute at a speed of 1,000 revolutions per minute. The stroke of each sleeve is $1\frac{1}{8}$ inches and its speed is but 93.7 feet per minute, or little more than one-tenth that of the piston. This fact makes the problem of lubricating the motor a most feasible one, the slow movement of the sleeves distributing the oil between them, as well as between the outer sleeve and the cylinder wall.

Daimler Oiling System

Fig. 8 on page 32 shows the oiling system used on the English Daimler cars using the Knight motor type and it is identical in principle with that on the Stearns. Beneath each connecting rod is a trough T, kept constantly filled with oil from the oil pump. On the lower end of each connecting rod is a scoop that dips into this oil and forces it into the lower connecting rod bearing. The oil is splashed onto the lower ends of the sleeves and is distributed over them. In the Stearns the oil pump is a gear type made up of two gears. From this pump six leads depart: One goes to the fan, four go to the oil troughs beneath the connecting rods and one goes to the sight feed on the dash. The sleeves are additionally lubricated by an oil pipe which is tapped into the top of each cylinder wall near the sleeve heads. The oil feed at this point is under positive control of the throttle and is only opened

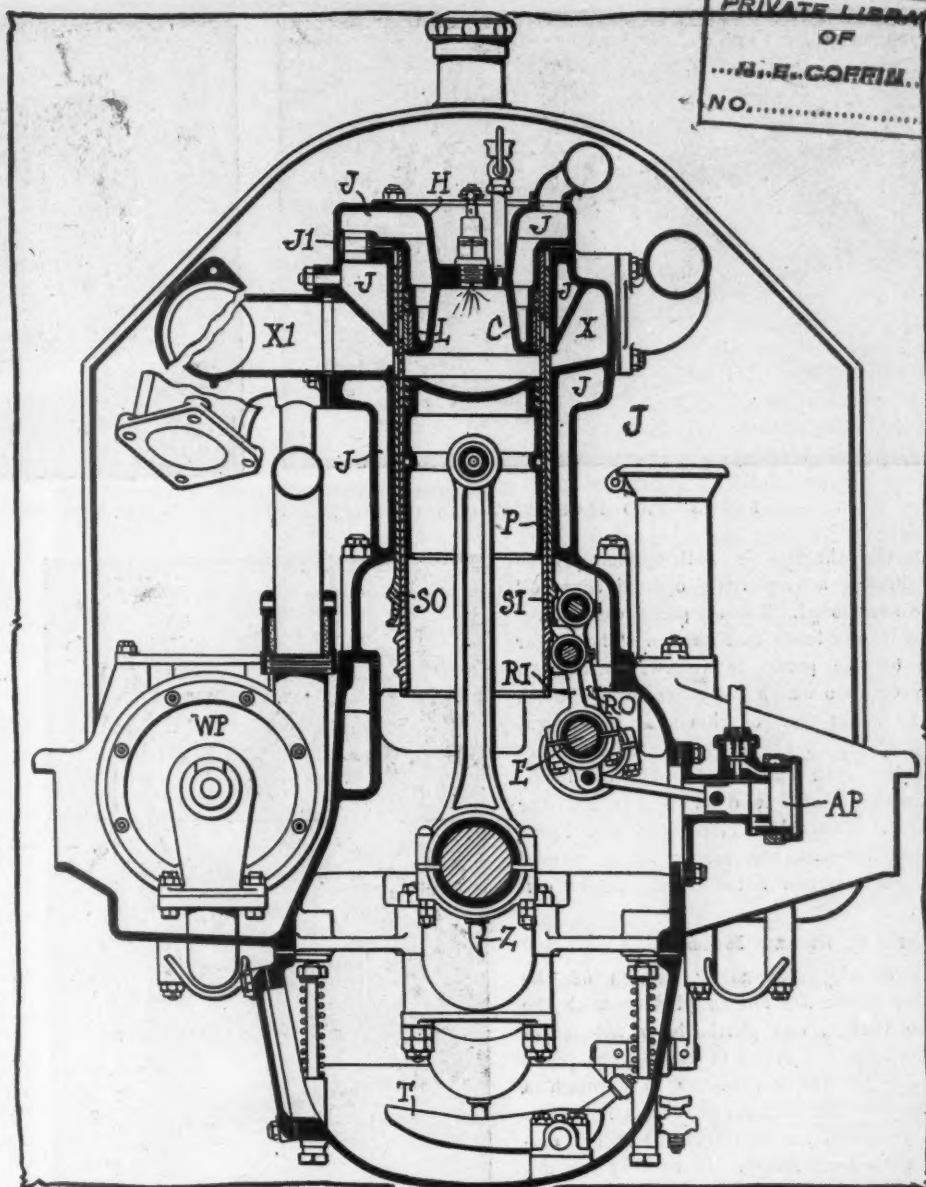


FIG. 7. END SECTION STEARNS-KNIGHT MOTOR

The parts are: P, Piston; SI, Inner Sleeve; SO, Outer Sleeve; E, Eccentric Shaft; RO, Connecting Rod for Outer Sleeve; RI, Connecting Rod Inner Sleeve; X, Intake Port; XI, Exhaust Port; WP, Water Pump; AP, Air Pump for Pressure in Gasoline Tank; J, Waterjacket Spaces; JI, Transfer Water Pipe to Convey Water from Jacket into Jacket on Cylinder Head; H, Detachable Cylinder Head; C, Combustion Chamber; L, Large Compression Ring between Inner Sleeve and Cylinder Head. There are Two Smaller Compression Rings Above it; T, Oil Trough Beneath Each Connecting Rod into which Scoop Z Dips, Forcing Oil to the Lower Connecting Rod Bearing. These Oil Troughs are Connected with the Throttle, Opening the Throttle Raises the Troughs and Feeds More Oil, Closing the Throttle Lowers them and Feeds Less Oil; in this Way Oil Is Fed Proportional to the Work the Motor Is Doing.

This illustration shows how the cylinder head H fits into the top of the cylinder and extends downward into the cylinder, leaving an annular space between it and the cylinder wall, which space receives the upper ends of the sleeves. On the cylinder head are the three compression rings, the lower one L being broader than the width of the ports on the inner sleeve, so that the port can slide past and above the ring. This ring with the two smaller ones above it prevent loss of compression on the compressive stroke. The spark plug is placed centrally in the cylinder head and to the side of it is the priming cup. The cylinder casting is a very symmetrical one, and being open at each end allows of easy manufacture. The lower half of the crankcase carries the oil pump, which keeps the troughs T constantly overflowing. This motor has what might be termed a spherical combustion chamber C. The cylinder head is heavily cupped and the piston head is hollowed out. The spark plug is in the top center of this space and directly above the center of the piston. Although the piston has a stroke of $5\frac{1}{2}$ inches, the connecting rods are 13 inches long from center to center. In the upper half of the crankcase are coreways through which the air enters before reaching the carbureter. This eliminates the inrushing sound of the air, which is out of place on a silent running car.

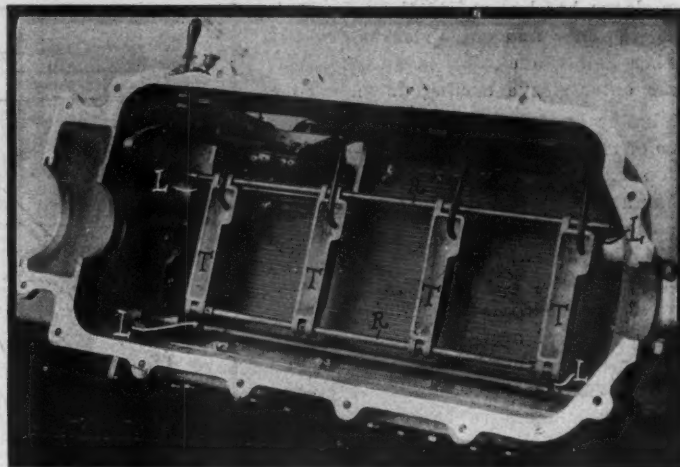
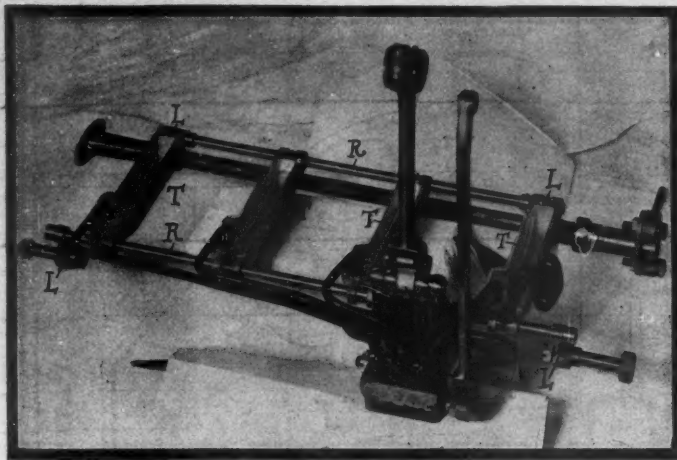


FIG. 8—TWO ILLUSTRATIONS OF OILING SYSTEM WITH THROTTLE CONNECTION

when the throttle is well opened. With the throttle a very little opened these oil leads are closed. The oil pump distributes oil to its six leads in rotation. The larger gear of the pump is hollow, forming a reservoir into which the gears force the oil. In the upper face of this gear is an oval port, which as the gear rotates registers with the open ends of the six oil leads, feeding into each lead as it is in register with it. The oil is circulated and recirculated through the motor being passed through a screen between successive circuits.

Features of Stearns Motor

All of the interesting details of the Stearns motor are not coupled up with the sleeve valves, one particularly attractive one being the method of taking the primary air for the carburetor in through a coreway in the crankcase, which has been done to avoid the whistling noise so common with carbureters. In casting the upper half of the crankcase, use is made of hollow supporting arms for the intermediate crankshaft bearings, the coreways for the arms forming a continuous passage with several wide openings. The cool air entering in this way keeps the crankcase temperature down and so maintains a lower temperature for the oil. This coring scheme slightly reduces the crankcase weight.

The ignition and cooling systems of the Stearns contain nothing radical. Forced water circulation is maintained by a centrifugal pump; and a cellular radiator is used which is supported entirely on the forward end of the motor—through two supports, one being the flanged end of the water pipe to the jacket, and on the opposite side is a similar dummy bracket. This mode of mounting frees the radiator from any strains occasioned by frame warping.

In the transmission system the constructions of this year are followed. The dry-disk clutch is continued. It is made up of eight steel disks, one alternate set having both sides faced with fabric. The selective gearset remains unchanged, except in some minor details in the mounting of the thrust bearings. The set gives three forward

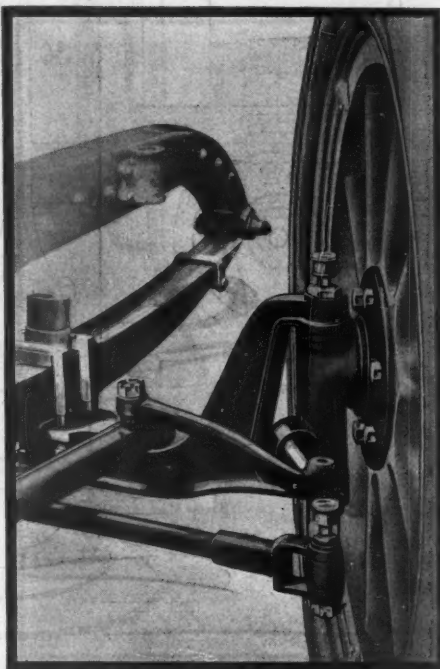


FIG. 9—STEERING PARTS ON STEARNS

selective variations with a ratio of 3.9 to 1 on direct drive. The gearset is an integral unit with the rear axle carried in the diamond-shaped support of the forged portion of the axle.

Two wheelbases are used, one 121 inches for touring car, limousine and landaulet, and the other 116 inches for toy tonneau and roadster. The tires on all body models are 36 by 4 inches all around.

The car is well equipped for the buyer, because in addition to an electric lighting system consisting of two electric headlights, two combination oil-electric dash lamps, an oil-electric tail lamp and an electric tonneau lamp there are top, windshield, demountable rims with quick-detachable flange, electric horn and tire carrier.

Motor Age's representative took several short rides in the sleeve-valve Stearns with the object of noting its performance in accelerating work. With stop watch and tested speedometer the acceleration using gear was as follows, four adults being in the car, on a level macadam road:

Miles per hour	Seconds
10	2
15	4
20	5
25	8
30	11
35	14.5

NEW COLUMBIA ELECTRIC

The output of the Columbia plant of Hartford, Conn., is to be very largely increased, with the building plans now under way for a new electric vehicle. The new car has shaft drive. The suspension

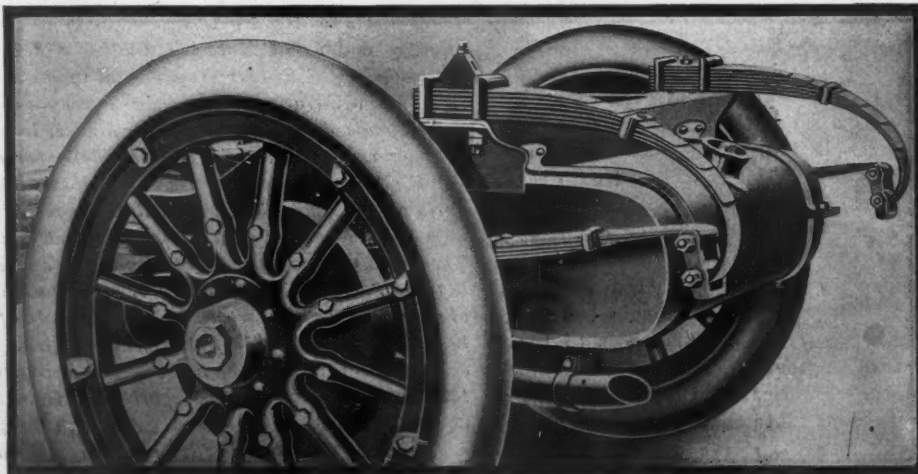


FIG. 10—THREE-QUARTER SPRING CONSTRUCTION ON STEARNS CHASSIS

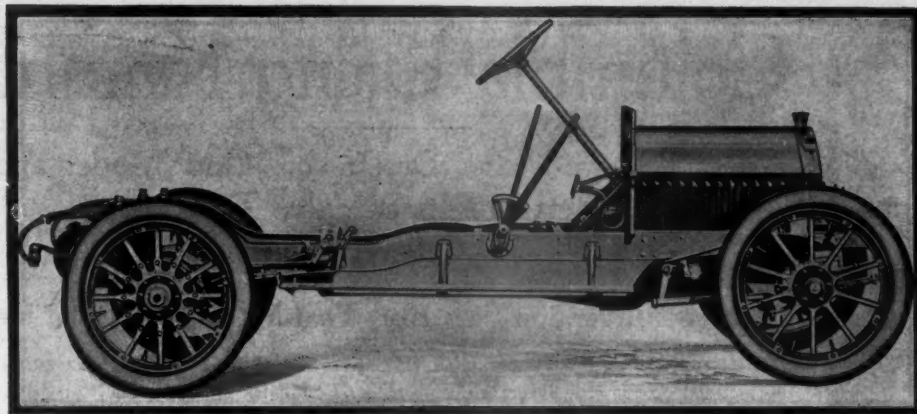


FIG. 11—SIDE VIEW STEARNS-KNIGHT 1912 CHASSIS

of the shaft-driven motor is one of the most interesting features. The car is particularly distinguished by its very long wheelbase and for the low appearance it presents. The wheelbase is 90 inches. The frame is dropped in the rear and the front springs are underslung from the front axle, so the car sets close to the ground, yet possesses the average road clearance. The frame is of U-section ring into the ends of which tubes are inserted to carry the drive shafts. This pattern, while the rear axle is of the full pressed steel. The front axle is of I-beam floating type, made up of a large forged design allows of the differential and main drive bevel gears being easily removed and inspected. The motor is directly suspended to this rear axle at one end, while the other is fastened by a ball joint to the frame. The batteries are divided into three trays, one being carried forward, while there is one on each side of the motor. The controller also is mounted directly to the frame. The steering is either by lever or wheel. It is designed to make use of either Edison or Exide batteries. The new vehicle is to be marketed by the United States Motor Co.



FIG. 12—FRONT END OF STEARNS-KNIGHT 1912 MOTOR

that it is fit for the road and any use on the road that the owner will ask.

Work as a tester in a motor car factory, offers splendid opportunities to the young mechanic. It is a quick builder of reputations. The tester takes the car from the assembly department, after its working parts have been packed with grease and shot full of oil, for its maiden run. The road work it is put through is severe. It has to be for the tester must make a re-

port on the speed-going and hill-climbing abilities of the machine. He has to make all his own adjustments in every part of the car and is required to make a detailed report of what his eye and ear have told him about the car. If changes are required to make the car a good car, it's the tester who tells the factory superintendent.

After the first paces have been gone through, the car passes to the head tester and then it has its body fitted on and is sent to the paint shop. That's where the tester rides on velvet but his work here is all important. The car must work harmoniously, without any pounding or clanking and the tester has to keep his ears and brain working to determine the running qualities and the regularity of the engine. Then the car is put back in the factory, cleaned, the final adjustment of brakes and timing gears are made, the brass is all polished up and the car is tagged for shipment.

Not so long ago complaints were pretty thick throughout the cities because of the reckless speeding of testers. Generally those testers were the ones who were not making good, for the valuable tester is the man who knows how to handle his car on the city streets.

Our factory does little if any street testing. Surrounding its engine and chassis testing building is a racing track, five laps to the mile. On that track, the testers do their driving.—Regal Motor Car Co., J. D. Wilcox.

MOTOR CAR LITERATURE

The New England Equipment Co., Boston, has issued a leaflet telling of the advantages of its Phelps trouble finder for ignition systems.

A new carbureter on the market is the Newcomb, which the Holtzer-Cabot Electric Co., Boston, is illustrating and describing in a booklet recently issued.

A 1912 commercial catalog is that of the Cameron Car Co., Beverly, Mass., which describes and illustrates in a conventional manner the Cameron truck for next season.

The Peerless Motor Car Co. announces its 1912 line of Peerless cars in the form of a folder garbed in a simple blue paper cover. The different types are illustrated, accompanied by short specifications of each.

Manufacturers' Communications

THE TESTER'S JOB

Detroit, Mich.—Editor Motor Age—Hundreds of young men are being attracted into the motor car factories where their abilities, fresh and keen, are finding full expression in good work done and good salaries earned. The factory superintendents find their office hours somewhat taken up considering applications from young mechanics who wish to hire out as testers.

The tester's work is the last link in the manufacture of the car between the producer and the owner and that link must not be the weakest if the car is to gain a reputation for roadgoing qualities of endurance. The tester has problems to study no less interesting than the designer's and assembler's. His O. K. on a car means

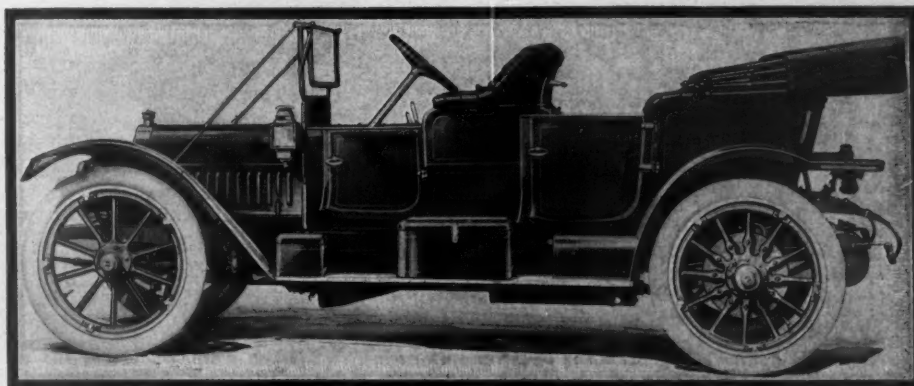
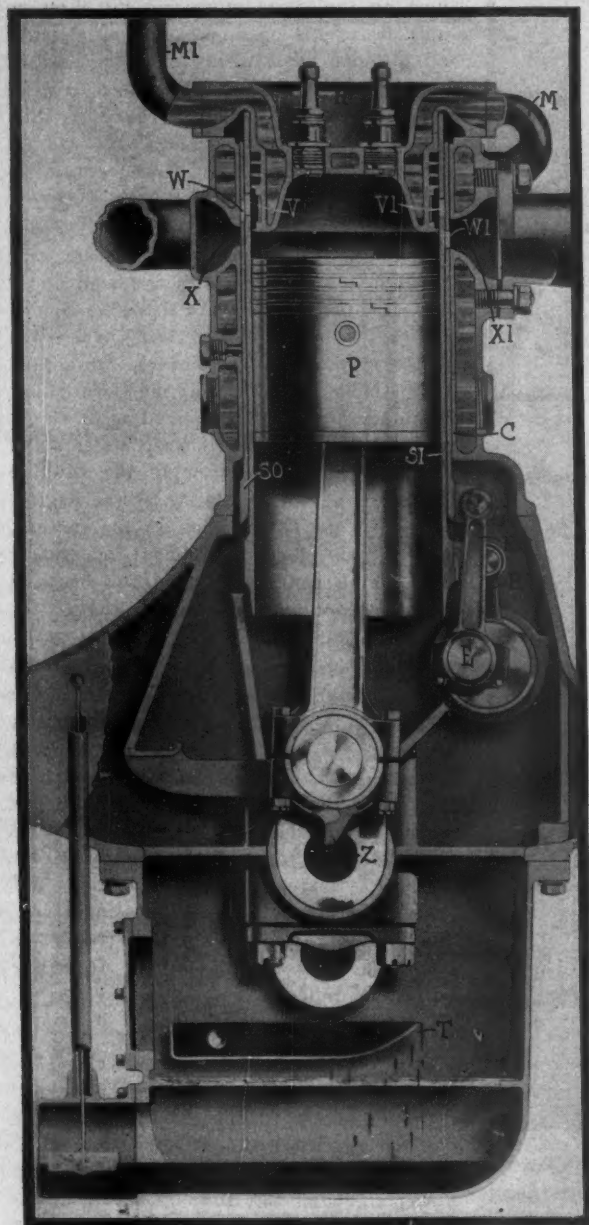


FIG. 13—THE STEARNS CAR FITTED WITH STEARNS-KNIGHT MOTOR



END SECTION OF COLUMBIA-KNIGHT MOTOR

This illustration shows the general scheme of the new Columbia motor of the Knight type with reciprocating sleeve valves. Between the cylinder wall C and the piston P are two sleeves, S1 and S0, one inside the other. The two sleeves are reciprocated from what is called an eccentric shaft E by means of short connecting rods R1 and R0. This eccentric shaft is driven by silent chain from the crankshaft. Both of the sleeves, S1 and S0, have slots on opposite sides near their tops, the inner sleeve slots are marked V and V1, the outer sleeve slots W and W1. In the side of the cylinder are corresponding slots X and X1. The three slots on the left side constitute the intake valve; the three slots on the right side the exhaust valve.

As illustrated, both intake and exhaust openings are closed. When the ports or slots in the two sleeves on the left register with the slot in the cylinder wall the mixture enters, or, in the phraseology of the poppet-valve motor, the intake is open; when the sleeve slots on the right begin registering with the cylinder slot X1 the exhaust is open. The eccentric shaft rotates at one-half the crankshaft speed. The sleeves reciprocate scarcely 2 inches, so that their movement is very slow compared with that of the piston. Beneath the crankshaft is an oil trough T, which is kept filled from the oil pump. A hollow scoop Z on the lower end of each connecting rod dips into such a trough, and forces the oil to the connecting rod bearing. These oil troughs are interconnected with the throttle, so that

Columbia Using Knight

Adopts Sleeve-Valve Design on One Model and Retains Poppet-Valve Type on Other Model

Chicago Invention a Big Feature in 1912 Line

ONE of the most striking characteristics of the 1912 line of cars manufactured by the Columbia Motor Car Co. is the adoption of the Silent Knight type of sleeve-valve motor in one of its models, but retaining the poppet-valve type of motor in its other model. This marks the introduction of the sleeve valve into America, two other car concerns having arranged to use it this year.

The Knight motor is called a sleeve-valve type because, as the illustration on this page shows, it has not the ordinary mushroom or poppet-valve to control the entrance of mixture and exit of the exhaust. Rather, there are in each cylinder two sleeves between the piston and the cylinder wall. These sleeves have slots cut in their opposite sides near the top. There is a corresponding slot cut in the opposite side of the cylinder casting. The slots on one side, when they register, allow the mixture to enter; the slots on the other side, when they are in register, permit the exhaust to escape. These sleeves are reciprocated; that is, moved up and down by means of an eccentric shaft driven from the crankshaft. The sleeves are connected with the eccentric shaft by a short connecting rod. As the sleeves reciprocate the intake and exhaust ports are opened and closed according to the cycles of the engine, which is a conventional four-cycle one.

Sleeves Take Place of Valves

These two reciprocating sleeves, taking the place of valves, constitute the leading characteristic of the Silent Knight motor. The sleeves are cast iron, machined and ground inside and out, and on the outer surface are grooves to conduct the lubricant between the sleeves as well as between the outer sleeve and the cylinder wall. The sleeves are of Swedish gray iron and together with the rings and pistons are manufactured in a foreign foundry.

This Columbia-Knight motor is a four-cylinder type with cylinders cast in pairs and having 4 $\frac{7}{8}$ -inch bore and 5 $\frac{1}{8}$ -inch stroke, which gives an S. A. E. rating of 38 horsepower. As the illustration on this page shows, the combustion chamber of each cylinder is entirely different from that used in a poppet-valve motor of the T or L type. Roughly speaking, it is a spherical combustion chamber, which form is made possible by concaving or making the interior of the cylinder head concave and also hollowing out the head of the piston. There is not any offset at the right or left side as in a T-head motor, but all of the gases are exploded above the piston head.

Construction of Motor

The construction of the motor is considerably different from that of the poppet-valve in that a separate head H is used, which bolts to the top of the cylinder casting. This head has a central portion which projects into the head of the cylinder, leaving an annular space between it and the cylinder wall. This annular space is needed to accommodate the two sleeves forming the valves, these sleeves having to rise well above the intake and exhaust slots in the cylinder walls in order to retain compression. This cylinder head differs in another respect, also, in that it carries three piston rings, similar to those carried on the pistons. These rings are between the cylinder head and the inner sleeve, and prevent the loss of compression on the compression stroke.

There is still another difference between this cylinder head and that used on poppet-valve motors, namely, that it is copiously waterjacketed, the end section of the motor showing how the water is conducted through a transfer pipe M from the waterjacket on the cylinder wall to the jacketing space in

when the driver opens the throttle he raises the troughs so that more oil is scooped up. When the throttle is closed the troughs are lowered. The float with ball indicator on the top of the stem shows the height of oil in the crankcase.

The cylinder head H is separate from the cylinder walls, is bolted in place and is water jacketed, the water transferring from the jacket surrounding the wall through the pipe M, and finally passing to the radiator through a return pipe M1. The head is concaved and the piston head also concaved to give sufficient combustion space of spherical design.

the cylinder head, and further how the water passes from the jacket space in the cylinder head through the pipe M1 to the top of the radiator.

Readers must not confuse this motor with the two-cycle design simply because it is without poppet-valves. It is an out-and-out four-cycle motor, having the regulation suction, compression, explosion and exhaust strokes. On the suction stroke the slots V and W on the inner and outer sleeves register with the slot X in the cylinder wall, and the mixture is inspired by the descent of the piston. On the compression stroke the intake and exhaust slots are both closed. They remain closed until after the middle of the explosion stroke, when the slots V1 and W1 in the sleeves begin registering with the slots X1 in the cylinder wall allowing the exhaust gases to escape.

Valve Timing Ingenious

It is by the ingenious timing of the inner and outer sleeves that the proper registering of the slots in the sleeves with the slots in the cylinder wall is obtained. One of the sleeves is approximately 70 degrees in advance of the other, and they are set in a fixed relationship with the crankshaft, so that once the engine is started there is no possibility of the timing getting out. No matter what the speed is these valves must open and close at the proper time, which is one of the strong claims advanced for this type of motor, namely, that at

speeds as high as 2,500 or 3,000 crankshaft revolutions per minute a satisfactory mixture is obtained owing to the proper opening and closing of the ports. As there is not any pounding of setting valves the noise is considerably reduced in this motor as well as the amount of vibration.

The Lubricating System

The lubricating system marks the further development of what has come to be known as the movable dam system. Located transversely with the filtering screen of the lower crankcase are four troughs T hinged on a buss shaft and connected to the throttle. With the opening and closing of the throttle these troughs are thus automatically raised or lowered. When the throttle is opened and the troughs are raised the connecting rod scoops Z dip deep into the troughs and the troughs contain a greater amount of oil before overflowing. When the work is light the closed throttle lowers the height of the troughs so that they overflow more quickly and the scoops dip but lightly into the troughs and correspondingly less oil is splashed.

The overflowing oil first falls to the screen and is drained to the oil reservoir below, to be again pumped by plunger pump into the troughs, and a by-pass piped to a sight feed indicator upon the dash. The system is thus a combination of forced feed oiling and splash, and this system has been wholly satisfactory in Knight type motors abroad. The crankshaft is

bored hollow of very large diameters. The design of the shaft is such that lubricant travels to the bearing when caught.

The amount of oil in the reservoir may be noted by a ball-topped shaft mounted upon a bob cork float set outside of the crankcase and rising up to a conveniently noted position. The height of the oil can thus be determined at all times, in daylight and darkness. Into the supporting legs are set breathers for crankcase ventilation.

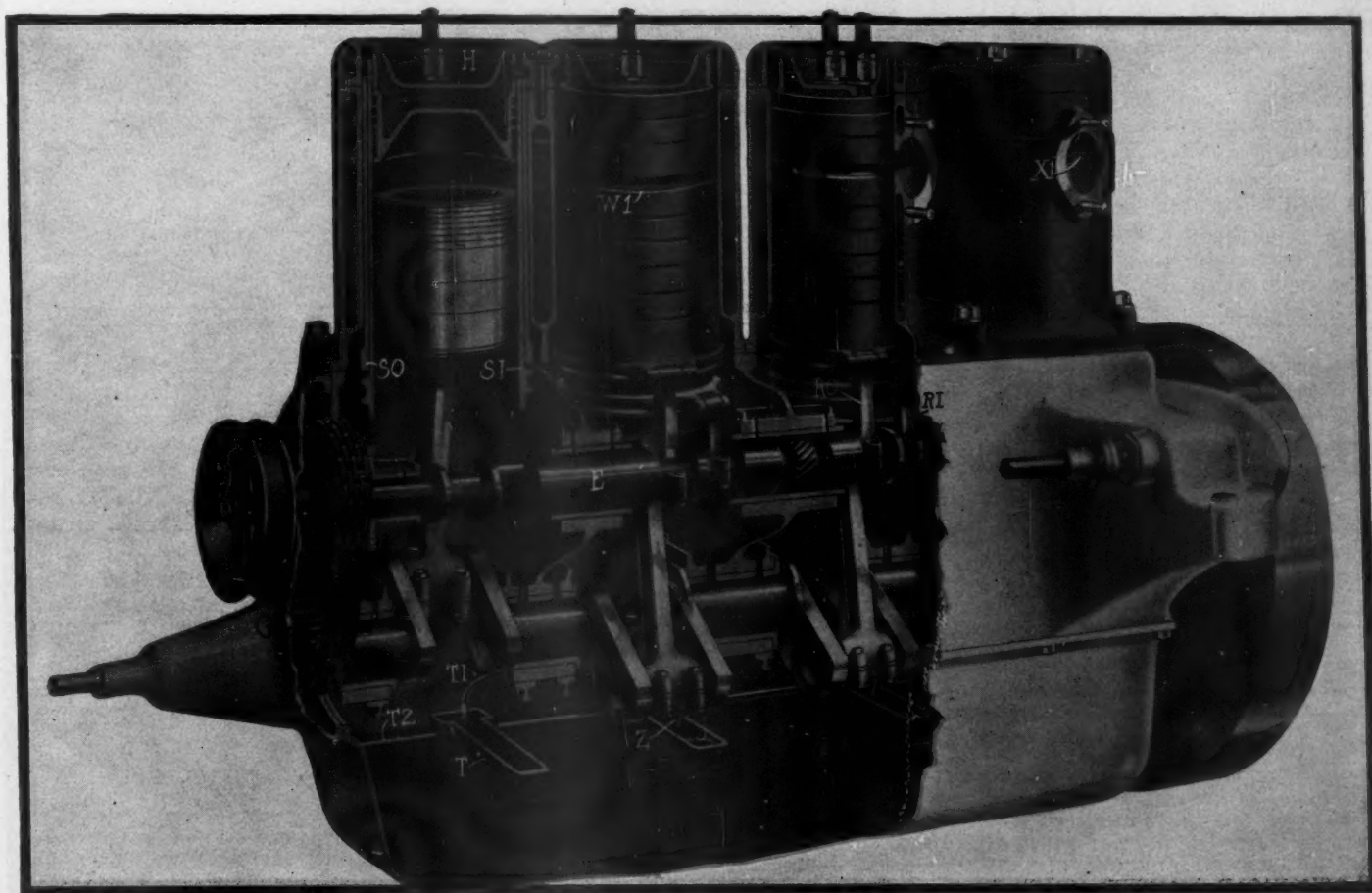
Silent Chains in Engine

The magneto and pump drive is by means of silent chain to the flywheel end of the motor, while the eccentric shaft is chain-driven from the forward end. The exhaust manifold has individual entranceways for each cylinder, while the inlet manifold has two main leads to each pair of cylinders, the cylinder port being two-way branched internally to give gas entrance to each cylinder.

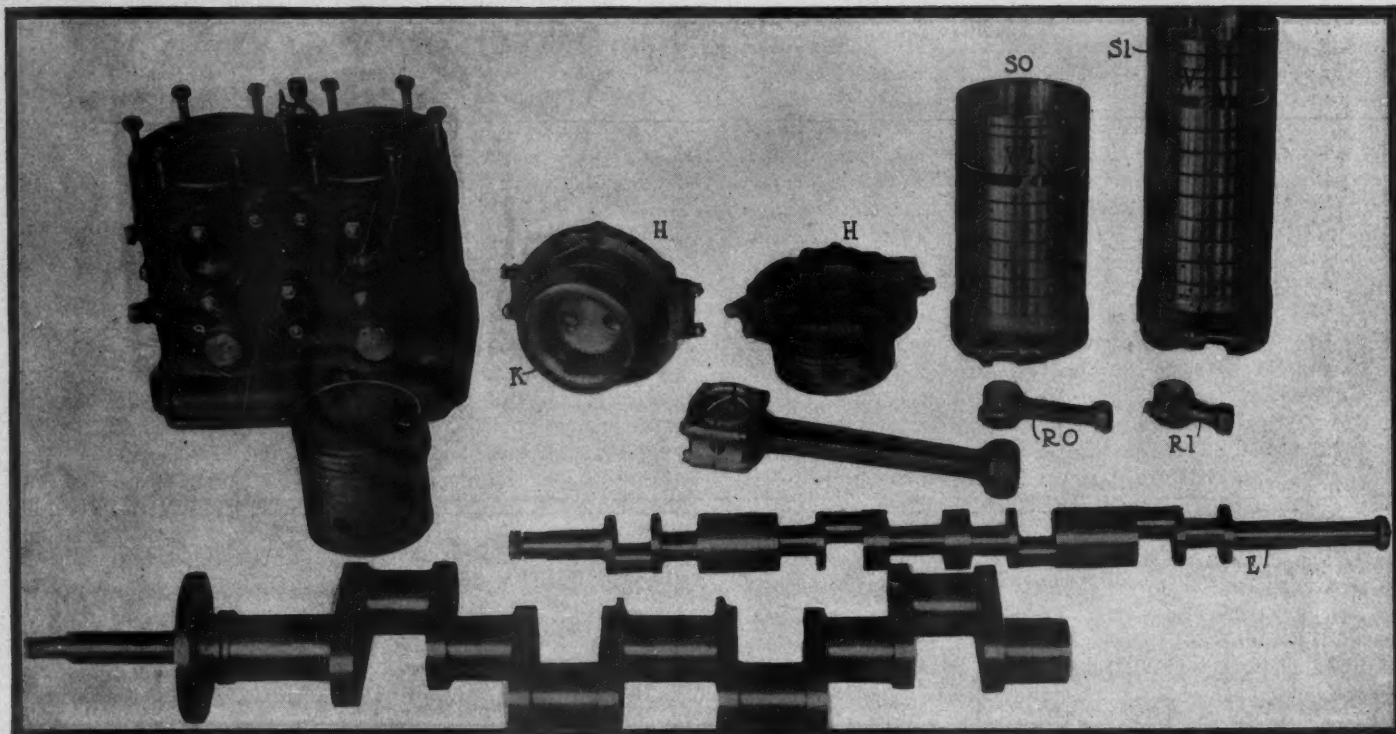
The ignition system is the Bosch double outfit with two sets of plugs, a pair of plugs being threaded into the head of each cylinder directly over the piston, the plugs being completely surrounded by the water-jacketing.

The water passages are large, the piping is of polished spun brass and the radiator of the cellular type with high peak and modish design.

Leaving the motor and passing to the consideration of the transmission system



Columbia-Knight Motor for 1912 Using Sliding-Sleeve Valves in Place of the Poppet Type, Showing Two Sleeves S1 and S2 Serving as Valves; Silent Chain Drive for Eccentric Shaft E; Oil Troughs T, with Oil Supply Pipes T1 and other Details of the Adjustable Oiling System Employed. The overflowing oil first passes through a screen and then is drained to the oil reservoir below to be again circulated by plunger pump



more standard constructions are met with. The clutch is a leather-faced cone type, and the gearset is a selective one with four forward speeds, the speed control and emergency brake levers being short and mounted in the center of the body floor in order to be operated by the driver's left hand, thereby leaving a free entrance to the car at either side; or, if desired, the levers may both be placed at the right side, either inside or outside of the fore-door body. The rear axle is a floating type, the housing being a malleable casting with heavy gauge tubes or axle sleeves hot riveted into the differential housing. In the differential the pinion and shaft are forged integrally and mounted within a cage upon short series Timken bearings. The front axle is an I-beam type.

In addition to the 38-horsepower car with the slide-valve motor, the company has a new T-head poppet-valve type, with cylinders $4\frac{1}{8}$ by $5\frac{1}{2}$ bore and stroke, giving a rating of 38 horsepower. This motor is much different from the T-head type one in that it has a motor-driven pump for inflating tires and also an air pump for maintaining a pure pressure on the gasoline tank at the rear.

The Columbia bodies cover a variety of lines. In the Columbia-Knight chassis, made with 129-inch wheelbase and 36-inch wheels, fore-door bodies are used exclusively. This chassis is built with a seven-passenger body and also has a six-passenger style. On the seven-passenger one the

types, two-passenger roadsters, and the usual closed styles such as limousines, landaulet, etc.

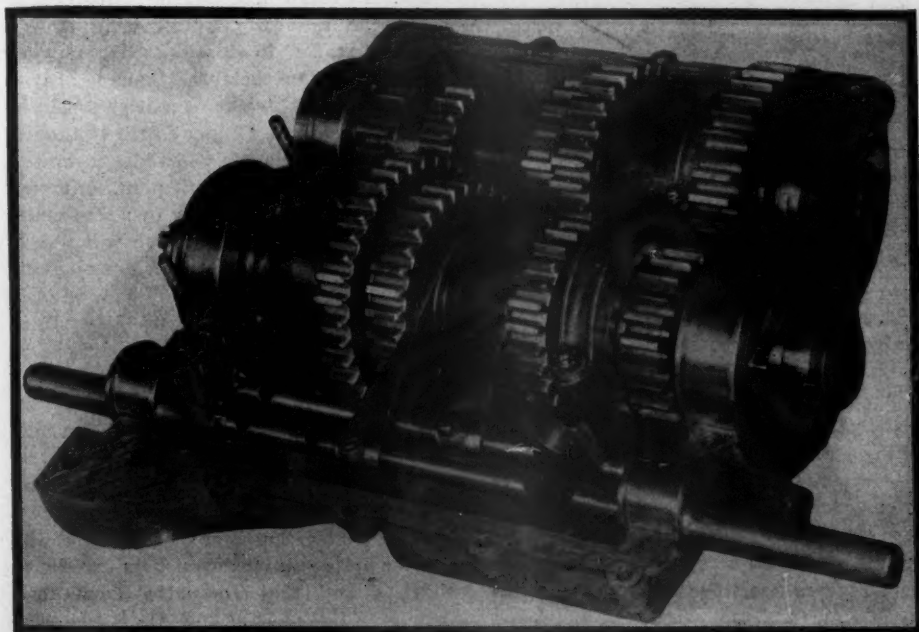
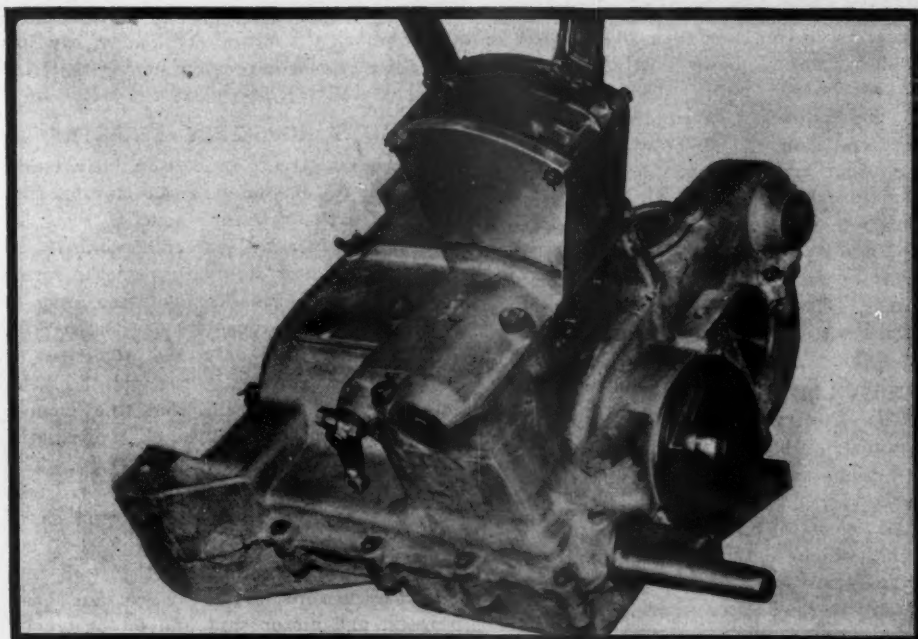
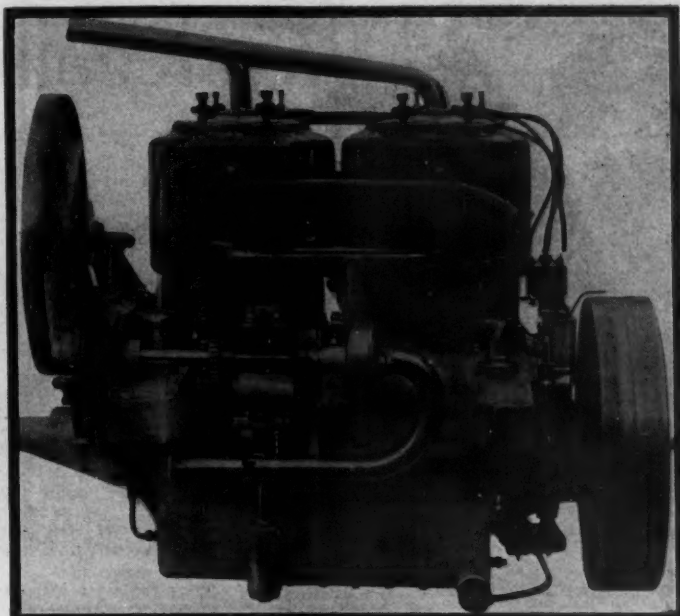
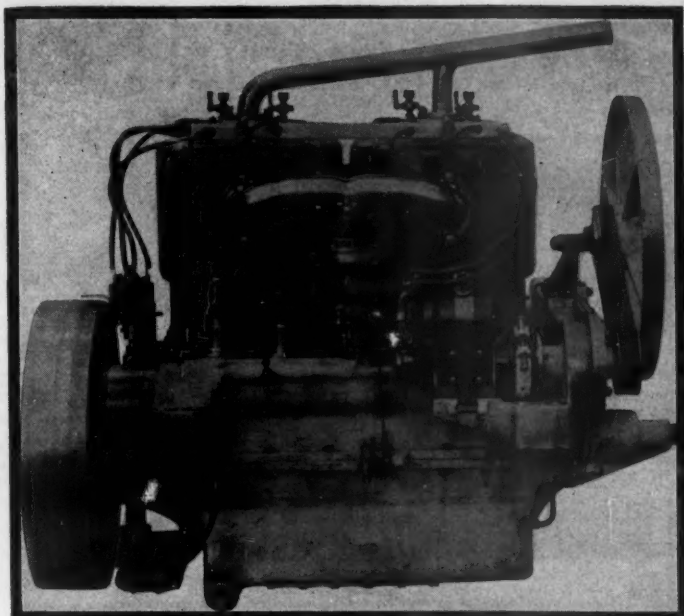
The Columbia 38-horsepower car with

poppet-valves is made with a seven-passenger touring car body with speed changes and brake levers in the center operated by the left hand; six-passenger roadster type,



UPPER ILLUSTRATION: PARTS ENTERING INTO COLUMBIA-KNIGHT SLEEVE-VALVE MOTOR: SI, INSIDE SLEEVE; SO, OUTSIDE SLEEVE; E, ECCENTRIC SHAFT; H, REMOVABLE CYLINDER HEADS WITH TWO SPARK PLUGS IN EACH; AND CYLINDER CASTINGS EMPLOYED

LOWER ILLUSTRATION: FRONT VIEW OF COLUMBIA KNIGHT CAR



rear seat is made 53 inches wide, exclusive of the side upholstery, whereas on the six-passenger body it is 44 inches wide. In addition, there are close-coupled roadster four-passenger roadsters, two-passenger roadsters, and close-coupled styles.



Motor Car Encyclopedia

"Dyke's Automobile Encyclopedia," a 400-paged book, consists of twenty-nine lessons with diagrammatic illustrations on the principles of construction and operation of motor cars and engines. There is a lesson on valve timing; another on magnetos, their construction, principles, etc.; still another on the operation of a car; in fact, every detail in connection with a car and its engine is given in simple language. There are over 100 charts varying from 5½ by 8 to 6 by 9 inches. The book concludes with a motor dictionary. Price, \$3. In conjunction with this motor encyclopedia Mr. Dyke uses working models of the different parts of a car. One side of the model of a four-cycle engine represents the end view of the engine, while on the reverse side is a sectional view of the engine. All the moving parts are made of metal. Price of working models, \$1 each. The encyclopedia should be particularly useful to the beginner or motor enthusiast studying fundamental principles.

UPPER ILLUSTRATIONS: RIGHT AND LEFT SIDES OF COLUMBIA POPPET-VALVE MOTORS

CENTRAL ILLUSTRATION: COLUMBIA GEARSET

LOWER ILLUSTRATION: COLUMBIA GEARSET WITH COVER REMOVED, SHOWING COMPACT AND SUBSTANTIAL CONSTRUCTION AND ARRANGEMENT



The Realm of the Commercial Car



GEORGE ROBERTSON DRIVES WHITE TRUCK AT MILITARY ENCAMPMENT

SAURER REACHES CHICAGO

THE Saurer truck, the pioneer freighter which last spring traveled from Denver to the Pacific coast, reached Chicago last Thursday on its way back across the continent. Its representative, W. M. Thompson, is ambitious to have the big Swiss truck be the first power wagon to travel from coast to coast under its own power. With this idea in mind the Saurer was shipped by freight from San Francisco to Pueblo, Colo., and on June 12 left Pueblo bound for New York city, in charge of A. C. Thompson and George McLean. The trip from Pueblo to Chicago was easily made. One remarkable feature of the truck as noted in Chicago was the condition of the Goodrich solid tires with which the vehicle is equipped. The tires have been on for 3,777 miles, and, although the truck has been run over roads hardly worthy of the name, the tires show comparatively little wear.

CHANCE FOR THE FARMERS

Taking advantage of the general exhibition at Roubaix, in the north of France, the agricultural commission of the A. C. F. has decided to hold a mechanical plowing match on September 7 and 8. Awards will be made for the best work done with plows operating to a depth of not less than 6 inches, account being taken of the cost of fuel, oil, electricity, etc., the time necessary for installing the apparatus, the number of men necessary for working the machine, the possibility of working on various kinds of land, and the various classes of farm work to which the motor plows can be applied. In calculating time account will be taken of the labor required to get the machines ready, the competitors being placed not less than 500 yards from the scene of operations and the time taken from the moment they say they are ready. If stakes have to be put in the ground for winding drums this time will be included in the plowing time.

Distinct classes will be provided for in-

ternal combustion motors and steamers. For the former there will be five divisions: Tractors costing less than \$3,000, plow included; motor plows costing less than \$3,000; motor plows costing less than \$6,000; tractors with winding drums costing less than \$3,000, plow included, and the same type of machine costing from \$3,000 to \$6,000. There are two classes for steamers, costing respectively less than and more than \$6,000, plow included. A separate class is provided for electric machines. The competition is open to machines of either French or foreign construction.

LOUISVILLE'S NEW INDUSTRY

The Electric Vehicle Co., which will manufacture electric trucks, has opened its new plant at Preston and College streets, Louisville, Ky. Later the concern will build electric pleasure cars. The new plant, which is the first in Kentucky to manufacture electric cars, covers 20,000 square feet of floor space. All of the machinery has been installed and the capacity of the plant at present will be about 100 cars each year. Those interested in the new company are Lee Miles, of the Miles Auto Co., E. M. Drummond and H. B. Hewett, who has been connected with the Cooper Hewett Co.

A panel delivery standard body, with other types optional, will be used on both the 600 and 1,000-pound vehicles. Chain drive has been adopted. A wheelbase of 86 inches is used.

FRUIT MEN BUYING CARS

There are now upward of ninety cars in the Hood river valley, Oregon. Nearly all of the prosperous orchardists of the valley either now have cars or are contemplating getting them. Not alone are the farmers buying cars for pleasure, but many of the farmers are considering the purchase of motor trucks to facilitate the handling of crops to market. The advent of the motor car into the Hood river country was made about 3 years ago when a motor stage line

from Hood river to Cloud Cap Inn at Mount Hood was introduced. With the success of this venture the motor car has steadily gained in prestige among the fruit men of the fertile valley.

PREDICTS HORSELESS STREETS

Horseless streets in certain busy traffic sections of Boston are an approaching certainty, if Professor James S. Pray, of Harvard university, is a true prophet. In one of the most interesting of the series of city planning talks Professor Pray is giving under the auspices of Boston-1915, he predicted not only the abolition of the use of the horses in the streets of the modern city, but said that the change by which the horse will be eliminated will take place in the very near future. The change is bound to come, he said, and will be of advantage to health as well as to traffic. Legislation will be passed, according to Professor Pray, that will forbid the use of horses in certain busy streets, and motor cars and motor trucks will take care of the traffic in those sections. In this connection he sharply criticized the absurdity of allowing slowly-moving traffic to block swiftly-moving traffic. And another great change that is coming in city traffic conditions will be the establishment of great freight tunnels such as have been built in Chicago by private capital. The ideal plan, however, is to have the municipality own and maintain the freight tunnels, which will relieve the streets of bulky and slowly-moving traffic.

Professor Pray stirred up interest in another direction also by claiming that residence areas would be more perfectly planned if the footways, or sidewalks, were oftener separated from the wheelways, or roads, which would mean a reduction of the number of wheelways and more land available for residence lots. He said that often there is no need of the number of roads that exist in residence districts and that footpaths from resi-

dences to the highways would serve in many cases far better than the regulation streets serve today.

In discussing the problem of the center of traffic density with which he closed his previous talk, Professor Pray said that this problem has not been carefully studied in Boston, although it is an important factor in street planning. In Boston, he said, the center of traffic density is not centralized as it might well be for efficiency.

"After all," said he, "the center of traffic density is not a single point, but a circular area of some extent. We can at least, in looking at the district as a whole, say the Boston center of traffic density is the northern end of the peninsula of Boston, including both the great railroad terminals and the business section. To come down to anything closer than that will give us but a temporary result because we will probably have in time closer relations between the two terminals."

SOLDIERS TRY MOTOR TRUCK

It seems a far cry from the winning driver of the Vanderbilt cup races to the peaceful pursuit of driving the life-saving ambulance of the Seventh regiment of New York, last week encamped at Peekskill, but this is just what happened and the man is a well-known racing driver, George Robertson, a corporal in the Seventh regiment.

When the motor ambulance was first brought to the camp the officers refused to take it seriously, but after one or two demonstrations of what it could do for men prostrated by heat in the maneuvers around the mountains where rough cross-country driving was necessary, it soon became the most popular conveyance around the camp and was worked day and night, often making as high as ten trips a day to Peekskill for supplies.

One of the best demonstrations of the effectiveness of the motor ambulance was made Friday when one of the scouts from the reconnoitre column of the West Point cadets, who were attempting to capture the Seventh regiment's encampment, in attempting to put his horse over a wire fence was badly thrown, the horse falling on him. In about 30 minutes from the time the injury was known the White motor am-

bulance picked him up and conveyed him to West Point, a distance of some 8 miles, where his injuries were pronounced very severe but with hopes entertained for his life. It was stated authoritatively, if he had been compelled to await ordinary methods of conveyance he would have been dead before he reached the hospital. This drive was made through some very bad and muddy roads, the ambulance carrying seven men.

SPRINGFIELD'S EXPERIENCE

An interesting story of a city's actual experience with a motor fire engine is told in the annual report of Fire Chief Samuel F. Hunter, of Springfield, O. It being Springfield's first venture with the motor engine Chief Hunter kept an accurate account of the distance traveled, the speed, the number of runs made and the cost of upkeep of the car in comparison with the horse-drawn fire vehicle also used by the city.

At the end of 19 months it was demonstrated that the motor car engine cut two-thirds off the total expense and took the place of five horses, one steam engine and one combination hose cart, and of course materially increased the efficiency of the department.

According to Chief Hunter's report for the 19 months the engine, built on a 70-horsepower Thomas chassis and purchased from the Webb Motor Fire Apparatus Co., of St. Louis, Mo., pumped a total of 12 hours at fires and made 309 runs. The total cost for gasoline, oils, etc., was \$112.56, while the total tire cost was \$252.75. The engine and chassis are the same as used in the regular Thomas stock cars. The cost of maintaining horses, the repairs to apparatus and for fuel for the corresponding 19 months for one of the common types of fire engines was \$1,300.

MOTOR CARS CARRYING FREIGHT

Anticipating the probable shutting down of the trolley road from New Castle, Del., to Delaware City, Del., which connects with his line from Wilmington to New Castle, General Manager J. Eugene Wallace, of the Wilmington Southern Railway Co., has made tentative arrangements with Philadelphia parties for several motor

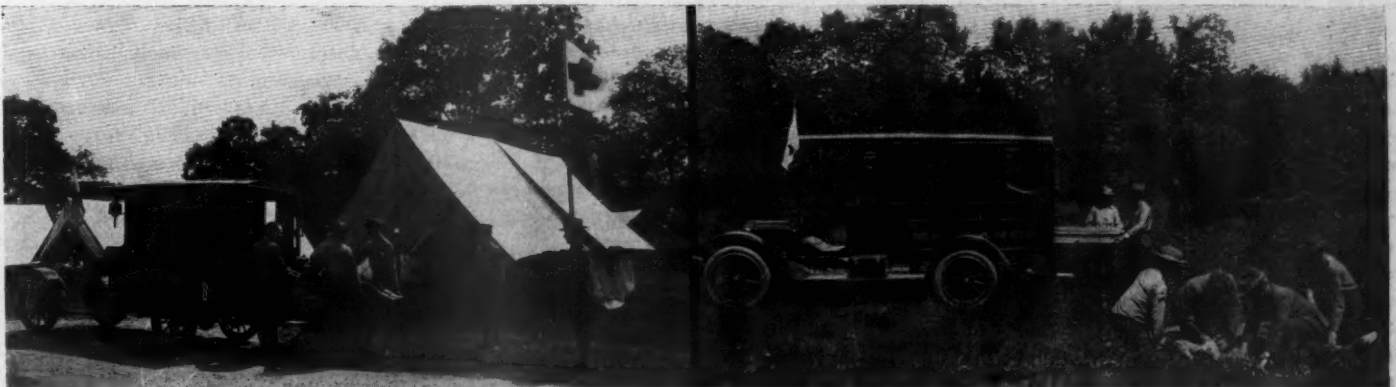
trucks to handle freight between New Castle and Delaware City, 9 miles.

The two trolley roads formerly belonged to one company, the Wilmington, New Castle and Southern, but the latter went into the hands of receivers, who, by order of the court, sold the road. New York interests represented by Mr. Wallace bought the section between Wilmington and New Castle, while the section between New Castle and Delaware City was bought by the bondholders. Ever since the sale, which took place 2 months ago, negotiations have been pending for the purchase of the lower end by the owners of the upper end, but the owners have been unable to agree on terms, though Mr. Wallace, by agreement, has been operating the lower end as well as his own road. This agreement, however, expired last week and until that time no arrangements had been made to continue the operation, and as the Delaware city line has neither power nor cars, it was expected that it would shut down on Friday. On that day Mr. Wallace arranged for motor cars to handle the freight traffic, but as he has leased the road for another month the order for the cars is withheld for the present.

Mr. Wallace says the freight business is profitable and if the present lease is not extended he will handle it after the end of this month with a sufficient number of motor cars.

RENAULT'S NEW POWER WAGON

An addition has been made to the Renault line of commercial vehicles by the production of a double-purpose truck designed for service on small farms or private estates. The first of the series to be produced will go into service on Louis Renault's private estate near Rouen. The chassis carries the standard type of two-cylinder Renault motor of 80 by 120 millimeter bore and stroke, fitted with a governor limiting the speed to 1,100 revolutions a minute. The carbureter is a slightly modified type, and the motor, like all the later Renault types, is fitted with an oscillating pump driven off the camshaft and assuring a constant circulation of oil. There is no indicator on the dashboard, and only a float projecting from the right-hand side of the crankchamber, to indicate the level of oil in the tank.



SEVENTH REGIMENT OF NEW YORK USES MOTOR TRUCKS AT ANNUAL ENCAMPMENT

From the Four Winds



FAMOUS ZIGZAG ON THE BENQUET ROAD FROM MANILA TO BAGNIO, TRAVELED BY THE WORLD-GIRDLING HUPMOBILE

JONES Joins Fiat Team—Walter Jones, who drove an Amplex at Indianapolis, has joined the Fiat racing team.

Zengel Will Drive National—Len Zengel, winner of the Fairmount park road race and reserve driver of the blue flying squadron, has made a permanent connection with the National company. Zengel will be seen, at the wheel of the big blue car in all of the principal events on the motor calendar.

Maine Shows Growth—There has been a very decided increase in the number of motor cars sold in Maine the past year as shown by the registrations since January 1. The figures now total 8,493 and of this number 1,205 have been granted since January 1. During May, when the deliveries began to get in and the roads had been dried up so that cars could be used, 672 machines were registered. May really is the beginning of the motoring season in the state and many purchasers who get earlier deliveries do not register until they are ready to go on the road, while others request that the deliveries be made about that month. This is the largest number of cars ever registered in any single month since cars were registered in the state. The best record previous to that was 469 cars in May, 1910. Similar increases have been made in the number of drivers' licenses issued,

there being 689 issued in May this year compared to 474 during the same month a year ago.

Keeping Tab on Scorchers—Hereafter a motorist arrested in Montreal for speeding will have to produce his license and a black mark will be put on the face of it. The next conviction for speeding will carry with it a fine of \$50 and the third black mark will mean a fine of \$100 and the cancellation of the license.

Columbus Club in New Home—The Columbus Automobile Club of Columbus, Ohio, moved into its new quarters Sunday, July 2. They are located in the Virginia hotel, at Gay and Third streets, and are commodious in every way. The quarters, which are located in the basement, were fitted up in luxuriant manner for the club. An informal housewarming will be held July 20.

Patriotic Offer—At a meeting of the directors of the Portland Automobile Club of Portland, Ore., arrangements were made to begin work on a larger scale on the Mount Hood road. E. Henry Wemme, the father of good roads in Oregon, subscribed \$5,000 to the good roads fund on condition that the fund raised for the work amount to \$50,000. Mr. Wemme stated he would give \$1 out of his own bank account to the Portland Auto-

motive Club for every \$10 the promoters succeed in getting for the road improvement work.

Montreal Plans Meet—There will be 2 days of racing in August at Montreal. The meet will take place on the Delormier race track.

Good Work in Kalamazoo County—With the completion of 17 miles of improved roads undertaken by the county highway commissioner this year, Kalamazoo county, Michigan, will have over 50 miles of highways which are considered the best in the state. Under the reward system there will have been paid over to the county by the state when the present work is finished between \$25,000 and \$30,000, all of which comes from those counties where road improvements are not carried on.

Marking a Route—Signs were placed on the Omaha-Denver South Platte route last Thursday, the work of marking the route being in the hands of the Omaha-Denver Good Roads Association. Organizations in various towns along the route which runs from Denver to Lincoln and then branches to both Omaha and Nebraska City were given charge of sections of the road. White bands 18 inches wide were painted around telephone poles at every point where the highway turns or branches. If there were no tele-

phone poles the tops of fence posts were painted, or guide posts were erected. A red band was used to indicate dangerous crossings or bad turns.

His Nineteenth Car—At least one Indiana physician has found motor cars practicable for use in his professional practice. Dr. C. W. Pagel of St. Paul has just purchased his nineteenth car.

Ride for Jewish Children—Nearly 150 Jewish children who are inmates of the Leopold Morse and the Dedham Home for Destitute Hebrew Children were taken on an all-day motor outing last week from Boston to Billerica and return. There were sixty-five motor cars used, and these were borrowed from owners in and about Boston.

Milwaukee's Orphans' Day—The Milwaukee Automobile Club will give its annual orphans' outing on July 12. William H. Pipkorn will again be in charge of the event. Instead of giving the orphans a ride and then a dinner in a park, the 200 or more waifs will be taken to the new clubhouse on the Blue Mound road for a general jollification.

Remembering the Orphans—The Columbus Automobile Club of Columbus, Ohio, will co-operate with the junior missions of Columbus in giving the Sunday school children, cared for by the missions, an outing near Grove City, Ohio, July 13. The club will donate sufficient cars to take the children, numbering about 1,000, to and from the park, and will also assist in the entertainment of the little folks.

Shoshone Falls Hill-Climb—The first hill-climb to be given in the state of Idaho will be held July 21 at Shoshone Falls, 5 miles from the city of Twin Falls. The climb will be under the auspices of the Twin Falls County Automobile Club, acting in conjunction with the Idaho State Automobile Association. The place chosen for the climb is an ideal one, first, because of its desirability as a testing ground for motor cars, and second, because of the rare scenic beauty of the surroundings. The great Shoshone falls, rushing over a sheer precipice with a drop of 212 feet, will be a drawing card for motorists from a distance, so that the prospects are good for an immense influx of cars on the day set for the climb. The climb will be over the grade on the Lincoln county side of Snake river canyon. This is a new road just completed last year, and it offers an exceptional opportunity for the drivers to give their cars a thorough test. The start will be at the ferry, where there is a level piece of road for a short distance. Just after the start is a hairpin turn, and then for the first 1,000 feet the grade is 9 per cent, and the next 1,600 feet it increases to 12 per cent. From this point to the top of the grim rock the grade is 15 per cent. The average grade is 12 per cent for the total length of the hill, a distance of 4,230 feet. The road

is smooth and free from rocks and will be easy to negotiate. A telephone will be installed so that the timers can keep accurate track of the progress of the cars.

Ohio Passes Pennsylvania—Passing Pennsylvania in motor car registration, Ohio now is the second state in the union in the number of motor cars registered with the state departments. J. A. Shearer, registrar of motor cars in Ohio, has received a letter from E. E. Major, state registrar for Pennsylvania, who says that 37,718 cars have been registered in that state. Up to July 1 there were more than 39,000 registered in Ohio. New York is first, with 70,828 cars registered.

Count in Wisconsin—Up to July 1 the state of Wisconsin has issued 20,750 license numbers. The registration law went into effect in 1907 and 20,750 cars have been tagged since that time. Although it would be unreasonable to presume that all of the 20,750 cars are in active service within the border of the state today, it is certain that nearly 20,000 of them are running. Licenses are perennial, unless the present legislature determines to change the law to make the fee \$5 annually.

Maryland Climb Postponed—The hill-climb which was to have been held Saturday, on the Belvidere hill, Mount Washington, under the auspices of the Automobile Club of Maryland, was postponed until later in the summer. This was necessary because of the fact that many of the members of the club, having holiday over until Wednesday, planned to spend the Fourth of July holidays out of the city. While no specific date has been mentioned, the climb undoubtedly will be held some time in September.

Doing Pioneer Work—Competing for a gold medal offered by the Victoria Automobile Association and attempting to make a trip by motor car from middle western Canada to the Pacific coast, a trip which never has been made, C. S. Taylor of Winnipeg is now en route for Victoria. The route to be followed by Mr. Taylor from Winnipeg includes the following towns and cities: Portage la Prairie, Brandon, Regina, Moose Jaw, Medicine Hat, Lethbridge, McLeod, Blairmore, Crows Nest, Michel, Sparwood, Fernie, Morrissey, Wardner, Fort Steele, Cranbrook, Aldridge, Tocht, Yahk, International Boundary, Snyder, Idaho, Bonner's Ferry, Idaho, Halfway House, Idaho, Newport, Wash., Camden, Wash., Elk, Milan, Chatteroy, Colver, Mead, Hillyard, Spokane, Davenport, Almira, Warerville, Wenatchee, Ellensburg, Cle Elum, Snoqualmie Pass, North Bend, Seattle, ferry to Victoria. Eventually, when



the old caribou trail is open through Hope mountains in British Columbia, the Canadian highway will not touch the state of Washington.

Old Man on Long Tour—C. W. Pool, the 90-year-old motorist who is driving a Brush runabout from Detroit to his home at Springdale, Ark., arrived in Kansas City Saturday. Notwithstanding the hot weather, Mr. Pool has stood the trip remarkably well. He spent the Fourth of July in Kansas City.

Trade Trip Planned—A trade trip to St. Louis is being planned by the motorists of Kansas City, Mo. The St. Louis motorists are planning to hold an endurance contest to Kansas City and want the motorists of Kansas City to go back to St. Louis with them. This contest is to take place the latter part of July.

Savannah Dates—Sanction has been granted the Savannah Automobile Club for running the grand prize race November 30, next. It had been decided to run three races, including the Vanderbilt, simultaneously, but the date originally selected has been changed and the Vanderbilt, Savannah challenge trophy and Tiedemann trophy races will be run Monday, November 27.

Will Get Out State Book—The Nebraska Automobile Association is going to get out a road book of Nebraska which will contain maps of every county in the state, and the main highways between the different towns, with descriptions of the same. Secretary D. E. Watkins while on his tours of the state, organizing county clubs, is getting these maps. The books are to be given to the members of the state association.

Wisconsin Commission Appointed—The Wisconsin state highway commission, created by the new law appropriating \$385,000 annually for construction and improvement of highways in the Badger state, will be composed of the following: John A. Hazelwood, former state senator, Jefferson, Wis.; John S. Owen, lumberman, Eau Claire, Wis.; J. H. Van Doren, business man, Birnamwood, Wis. The appointments were announced late last week. The commission will commence the administration of the new law at once.

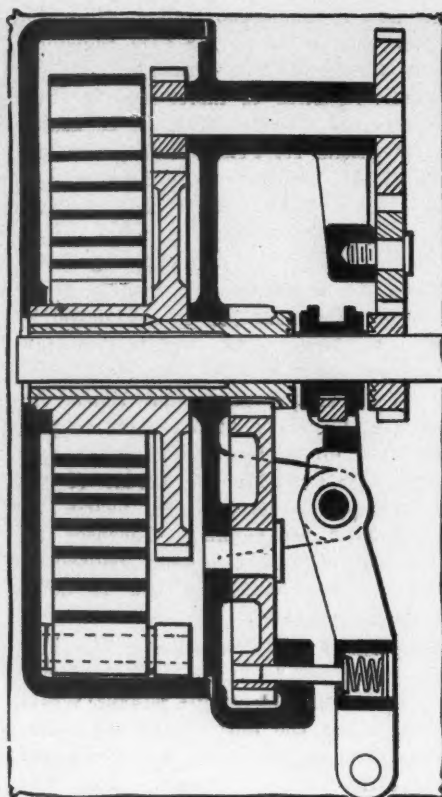
Making Picturesque Road—The commissioners of Flathead county, Montana, will, within the next 6 weeks, have completed a road through the beautiful Bad Rock canyon from the city of Kalispell, Mont., to the Belton entrance of the Glacier national park, connecting with the government road to Lake McDonald in the main range of the Rocky mountains. The road now is open from Butte, Mont., through Missoula to this point, it being 1 day's drive through the mountains to Missoula and another day to the park. The main north and south road lies for 30 miles along the Flathead lake and is one of the prettiest drives in the state.

Current Motor Car Patents

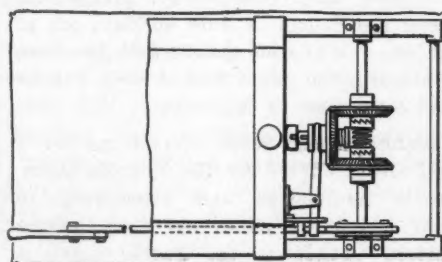
KENDALL Engine-Scarter—No. 994,932 dated June 13; to James B. Kendall, Chicago.—The engine-starter to which this patent relates is a combination with an engine shaft of a sleeve rotatably mounted on the shaft, a spring operatively connected with the sleeve, a pinion loosely mounted on the shaft, a train of gearing connecting the pinion with the sleeve, a clutch member splined on the shaft and adapted to alternately engage the sleeve and pinion, a lever adapted to operate the clutch member, a pinion mounted on the sleeve, a gear engaging the pinion, means on the gear for operating the lever, and means for locking the gear in its initial position.

Long Motor-Cranking Device—No. 995,613, dated June 20; to Winfield A. Long, Baltimore, Md.—This patent relates to a cranking device for motor cars by means of which the motor may be started from the driver's seat. As illustrated herewith, it is a combination with an engine shaft of a spring-actuated bevel pinion mounted slidably upon the shaft, a shifting lever to actuate the bevel pinion, a counter shaft, clutch-actuated bevel pinions to actuate the engine shaft pinion constantly in one direction when the counter shaft is oscillated, means for oscillating the counter shaft, and means for engaging the shifting lever to retain it when the pinion upon the engine shaft is projected against the tension of its actuating spring.

Hahn Valve-Removing Tool—No. 955,595, dated June 20; to Clarence Le Roy Hahn, Baltimore, Md.—This patent applies to a compressing device for valve springs comprising right angularly-formed bars having in their reduced overlapping engaging vertical arms two series of bolt holes, clamping bolts arranged in these holes whereby the bars are adjustably secured together;



KENDALL'S ENGINE STARTER

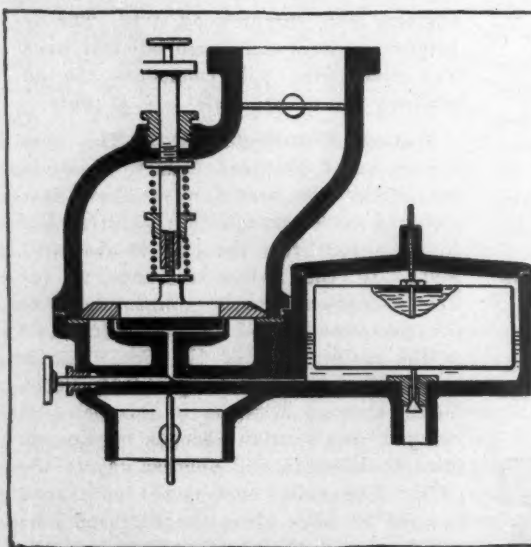


LONG CRANKING DEVICE

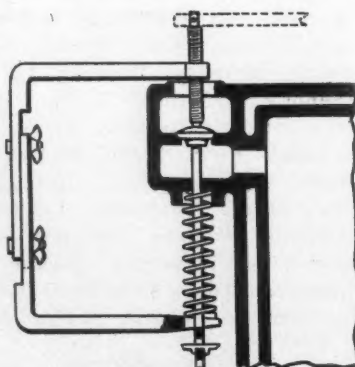
outwardly curved arms formed on the end of the lower bar adapted to be engaged with the end of the valve spring; pins on the extremities of the arms to engage and hold the spring against slipping on the arms, a threaded socket on the end of the upper bar and an operating screw arranged in the socket and adapted to be screwed into engagement with the valve whereby the device is drawn upwardly and the spring compressed so that its holding pin can be readily removed.

Smith Carbureter Design—No. 995,919, dated June 20; to Clement Smith, Topeka, Kans.—The carbureter to which this patent relates is a combination of a carbureting chamber having an outlet passage for the explosive mixture and an entrance for air, fuel supply means located in the chamber, a suction-controlled valve having an apertured portion, a guide rod threaded through the chamber wall and extending loosely through the aperture in the valve portion, a spring interposed between the valve portion and an abutment on the rod above the valve portion, a rod extending through and threaded in the guide rod and having an enlargement disposed below the valve portion, and a spring interposed between the enlargement and the valve portion.

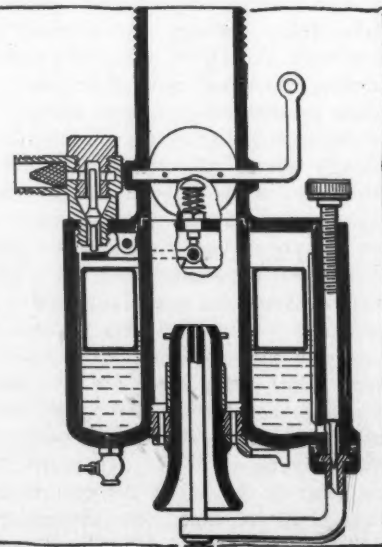
Maud Carbureter Design—No. 995,976, dated June 20; to Charles Edward Maud, Monterey, Cal.—This carbureter comprises a fuel chamber having an air passageway therethrough, a fuel jet connected with the chamber and arranged to discharge in the air-passageway, an air nozzle in the main air passageway, both the air nozzle and collar being longitudinally adjustable in the air passage and with respect to the fuel jet, and a valve flange slidably mounted upon the nozzle and normally closing the air passages in the collar.



SMITH CARBURETER DESIGN



HAHN VALVE-REMOVING TOOL



MAUD CARBURETER DESIGN

The Motor Car Repair Shop

A KNOWLEDGE of the relation between the valve and piston movements of a four-cycle engine and of the moving features of an ignition system gives one a key to almost all the motor troubles that generally arise. Practically all motor troubles are indicated by misfiring, knocking, overheating or failure of the motor to run at all; and every motorist who understands the valve and ignition timing of his car, in the majority of cases, can intelligently trace any of the above mentioned troubles to its source.

Of course it is to be understood that every motorist knows the four first essentials of motor operation: Oil, water, gasoline and electric current. The required quantity of all of these is absolutely necessary and in case of trouble of any sort they should be the first to be suspected. A lack of water or oil will cause overheating, misfiring and knocking. For the want of gasoline, which may first be indicated by misfiring and perhaps popping in the carbureter the motor, if running, will come to a stop; or if stopped, will make starting impossible until more fuel is taken on. Run down batteries often give very much the same indications as when running out of gasoline; when running on a battery that is almost discharged and it begins to get weak, misfiring will occur until the motor stops; then there will be considerable trouble in starting again unless one waits a while for the battery to recuperate, but even then it will only run the motor about long enough for the car to get under way again, when the motor again will miss a little, then stop.

In order that the relation between the valves and pistons may be understood, a diagram is shown in Fig. 2 that may be of some assistance. It shows the relative positions of all the valves and pistons of an ordinary four-cylinder four-cycle motor with one of its pistons on its firing center. A motor is known to be on its firing center when one of the pistons is at the top of the cylinder ready to descend on its explosion stroke. Each cylinder is numbered at the top; the front cylinder being No. 1, the second from the front No. 2, etc.; the exhaust valves are marked X and the inlets I; and the firing order of the motor is 1-3-4-2. Now, as there is a positive relation between the valves and pistons, there is a rule by means of which the firing center of a motor can readily be found by inspecting the exhaust valves. It is as follows: "When an exhaust valve is open the following cylinder to fire is on its firing center." To apply this rule one has but to turn the crankshaft with the starting

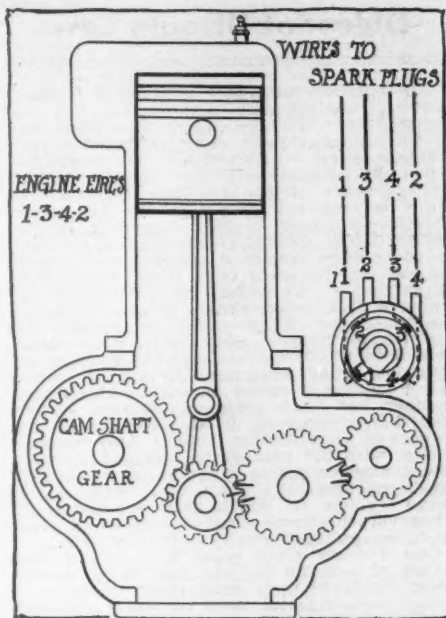


FIG. 1—FEATURES OF IGNITION TIMING

crank until the crank extends vertically upward, and stop. This brings the throws of the crankshaft into the vertical positions shown; then examine the exhaust valves and see which one is open. Having found the open exhaust valve, and knowing the firing order of the cylinders, the rest is easy. For instance, if as shown in Fig. 2, the firing order is 1-3-4-2, and the exhaust valve of No. 1 cylinder is open, then No. 3 cylinder is ready to fire, or is on its firing center. If it had been found that No. 2 exhaust valve was open, No. 2 piston would be at the bottom of its stroke ready to go up and

force the burnt gases out of the cylinder, and No. 4 cylinder would be about to fire. The firing order of any multi-cylinder motor may be learned by cranking the motor and watching the consecutive action of the valves.

Checking Ignition Timing

It often happens that ignition cables are disconnected from the spark plugs and magneto distributor without the operator taking the precaution of properly labeling or arranging the disconnected wires so that they can be properly replaced.

One rarely has occasion to disengage the gears which drive the magneto or timer; but in cases where this is necessary one should be most careful to see that the gears are properly marked as indicated in Fig. 1. In replacing the wires between the magneto and spark plugs, the first thing to do is to learn the firing order of the cylinders; the next thing to do is to get No. 1 cylinder on its firing center, then on removing the cover of the magneto distributor it should be found that the revolving segment of the distributor is in contact with the stationary segment to which No. 1 cable is connected, as indicated in Fig. 1. The motor then should be cranked slowly, and the direction of rotation of the revolving segment watched. In Fig. 1 the revolving segment turns in a clockwise direction so that it next will make contact with the stationary segment No. 2. As the motor fires 1-3-4-2, the cable No. 2 should lead to No. 3 cylinder, No. 3 to No. 4 cylinder and cable No. 4 to No. 2 cylinder.

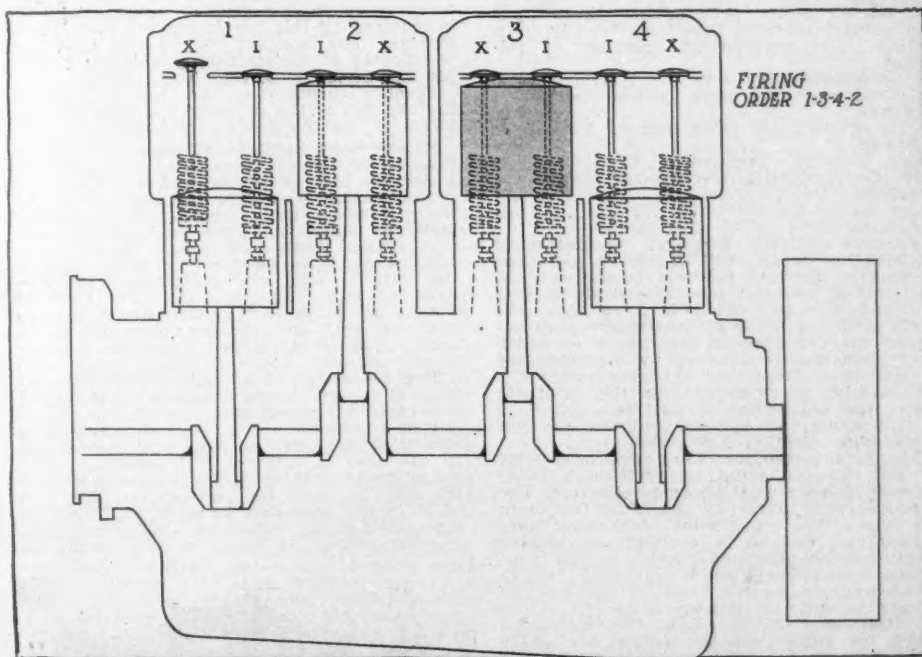


FIG. 2—SHOWING RELATIVE POSITIONS OF VALVES AND PISTONS IN MOTOR



Legal Lights and Side Lights

AT the request of the secretary of state Attorney General W. H. Stead has prepared the following digest of the new Illinois state law:

When Law Takes Effect—The law takes effect July 1, 1911. The motor vehicle law of 1907, as amended in 1909—the old law—is expressly repealed without any saving clause. This means that the old law will become a dead letter on July 1, 1911, and all registrations issued under it—regardless of their terms—will expire on July 1, 1911. In other words, a certificate of registration issued under the old law on any date prior to July 1, 1911, will be void and afford no protection to the owner of a motor vehicle on and after July 1, 1911.

To What the Law Applies—The act applies to motor bicycles and motor vehicles. It does not apply to bicycles, tricycles, or other vehicles propelled exclusively by muscular power. Section 1.

Definitions—Motor vehicle is defined by the act to include: "Automobiles, locomobiles, and all other vehicles propelled otherwise than by muscular power, excepting motor bicycles, traction engines, and road rollers, the cars of electric and steam railways, and other motor vehicles running only upon rails or tracks." Section 1.

Chauffeur—Any person, who operates a motor vehicle as a mechanic or employee or for hire. Section 13.

Non-Residents are defined as persons residing in another state and temporarily sojourning in this state for a period not exceeding 60 days in any one year. Section 8.

Public Highways include any highway, county road, state road, public street, avenue, alley, parkway, driveway, or other public place, in any county, city, village, incorporated town or towns. Section 20.

Local Authorities include all officers of a county, city, village or incorporated town, towns or road district, as well as all boards, committees and other public officers of such county, city, village, incorporated town or road district. Section 20.

Registration—The owner of every motor car is required, within 10 days after becoming the owner thereof, to file in the office of the secretary of state an application for a certificate of registration, which application must be made upon a blank furnished by the secretary of state, and under oath. Section 2.

Annual Registration Required—All motor vehicles and motor bicycles must be registered each year. All certificates of registration, regardless of month of issue, expire on December 31 of the year of issuance. Section 2.

Registration Fees—Registration fees for the calendar year, January 1 to December 31, for all motor vehicles are based upon horsepower—except those electrically propelled. The registration fees are as follows:

25 horsepower and less.....	\$4.00
35 horsepower and more than 25 horsepower	6.00
50 horsepower and more than 35 horsepower	8.00
More than 50 horsepower.....	10.00
For each electrically-propelled motor vehicle	5.00
Each motor bicycle	2.00

Section 2.
Persons applying for first certificates of registration, which will expire in less than 12 months, are not required to pay the full registration fee, but the amount to be paid for such shorter period is fixed upon the basis of the calendar months intervening between the first day of the month in which the application is received by the secretary of state and December 31.

In making this computation, the month in which the application is filed is counted as a full month. Fractional months are not considered. Section 2.

Credits and Rebates—Cars registered prior to July 1, 1911, must be registered under this act as soon as it becomes effective. The owner thereof must pay the same fee as in the case of the registration of a newly purchased car, but he is entitled to receive credit for the unearned portion of any registration fee already paid upon such car, to be ascertained on the basis of the number of months such certificate has to run before its expiration, figured from the month in which the application for registration under this act is filed to the month in which the certificate of former registration expires.

Digest of Illinois Law

All registrations under this act date from the day the application is received by the secretary of state and expire on the last day of the calendar year. Section 2.

Registration — Certificates — Numbers—Upon the filing of a proper application and the payment of the fee, the secretary of state is required to assign to the motor vehicle or motor bicycle described in the application a distinctive number, and issued to the owner thereof a certificate of registration, in the form of a card, which may be carried in the pocket, and deliver to the owner a seal of aluminum, or other suitable material, upon which must be stamped the registration number assigned to such motor vehicle or motor bicycle, and the year of the issuance, which seal must be affixed to the motor vehicle or motor bicycle to which such number has been assigned. Section 2, and also deliver prepaid, to the address of the owner of such motor vehicle two number plates, with the number so assigned thereon. These number plates must be conspicuously displayed upon the front and back of the motor vehicle to which they are assigned, whenever the same shall be driven or used upon the public highways of this state.

One number plate must be sent to the owner of a motor bicycle, and be conspicuously displayed upon such motor bicycle.

The number plates must be firmly attached so that they will not swing loosely. The rear number—the entire plate—upon motor vehicles must be not less than 20 inches above the surface of the ground, and all numbers at all times must be kept clean and free from dirt or grease. The number issued for each calendar year must be of a different design and color. No mark of identification, other than the seal and the number plates, is required to be displayed. The provision in the former statute, requiring numbers to be painted upon the lamps, is not included in this Act. Section 3.

Duplicate Certificates of Registration—Duplicate certificates of registration will be issued by the secretary of state upon the filing of an affidavit in his office that the original certificate has been lost, stolen or destroyed, and the payment of a fee of 50 cents. Section 2.

Non-Residents—Wherever non-residents have complied with the provisions of any law requiring registration of motor vehicles or motor bicycles, or the names of the owners thereof, in force in the city, state, territory or federal district in which they reside, and display upon their vehicles registration numbers, showing the initials or abbreviation of the name of such city, state, territory or federal district, substantially as is required by this law in respect to resident owners, they are not required to take out certificates of registration in this state during the period of a temporary sojourn.

Foreign corporations are not entitled to the benefits of the provisions of this act relative to non-residents. Section 8.

Registration in Case of Sale—In case of the sale of a motor vehicle or motor bicycle which has been registered under this act, the person selling it, before making delivery to the purchaser, must remove the number plate or plates and the registration seal, and, within 10 days after such sale, send a statement to the secretary of state showing the date of sale, the registration number, and the name of the purchaser, together with a filing fee of \$1; thereafter such registration seal and number plate or plates cease to apply to the motor vehicle or motor bicycle so sold.

The purchaser of a registered motor vehicle or motor bicycle takes no rights under the registration number or seal, but is required to register the car so purchased within 10 days of the date of purchase, as in the case of original registration.

Any person selling a motor vehicle or motor bicycle, upon the payment of the sum of \$1 to the secretary of state, can register any other motor vehicle of like horsepower, or less, owned by him, for the period his

registration certificate on the car sold has to run; and the seal and number plates removed from the motor vehicle sold will be assigned by the secretary of state to such other motor vehicle, and thereafter will apply to it until December 31 of that year. This is also applicable to motor bicycles.

In the case of a motor vehicle of greater horsepower, the former registration may be made to apply by paying "to the secretary of state such sum as added to the amount of the original fee paid for the year in which such motor vehicle was sold equals the amount of the registration fee provided by this act to be paid upon the registration of a motor vehicle of such greater horsepower." Section 7.

Application for Renewal—Old Number—All owners of motor vehicles or motor bicycles must, not later than January 10 of each year, file a proper application for the registration thereof, accompanied by the registration fee, in the office of the secretary of state. Section 6.

If an owner desires to receive the same number upon renewal of his registration, it will be assigned to him, provided he files his application for registration not less than twenty days prior to December 31, and requests the assignment of such number to the motor vehicle or motor bicycle owned by him. No certificate of registration can issue for less than the fee required for a calendar year. Section 2.

Fictitious Numbers—It is an offense to use or operate upon the public highway a motor vehicle or motor bicycle which displays thereon the number belonging to any other motor vehicle or motor bicycle or a fictitious number. This provision is not to be construed as prohibiting the display of any other number for a lawful purpose in addition to the number plates issued by the secretary of state. Section 6.

Manufacturers and Dealers—Every person, firm, association or corporation manufacturing or dealing in motor vehicles or motor bicycles, instead of registering each motor vehicle so manufactured or dealt in, may make application to the secretary of state under oath, on a blank to be furnished by him, for a general distinctive number for all motor vehicles owned or controlled by such manufacturer or dealer. And when this is done, such manufacturer or dealer is not required to register all motor vehicles so manufactured or dealt in, as in the case of other owners. Section 5.

Manufacturers—Fees—The fee to be paid by manufacturers and dealers for such registration is \$15 for each calendar year.

The certificate issued to a manufacturer or dealer expires December 31 of each year and may be renewed annually. The provisions relative to the pro rata payment of registration fees for private motor vehicles apply to the registration fee of manufacturers and dealers. Section 5.

Manufacturers—Numbers and Plates—Manufacturers or dealers to whom a certificate of registration issued will be assigned a general distinctive number by the secretary of state and will receive from him a certificate of registration and a registration seal, as in the case of private owners; also two number plates, distinctively different from the private plates, but of the same color, which number plates must be displayed conspicuously upon the front and back of every motor vehicle of such manufacturer or dealer when same is driven upon the public highway. As many duplicate plates as may be desired can be obtained from the secretary of state upon the payment of \$1 for each duplicate.

The registration certificate issued to a manufacturer or dealer does not apply to motor vehicles operated by such manufacturer or dealer for private use or for public hire. Section 5.

Local Registration Ordinances Prohibited—The owners of motor vehicles except motor trucks or motor-driven commercial vehicles holding registration certificates under this law are not required to pay any tax "for vehicles carrying loads or any other tax upon the use of any such motor vehicles or motor bicycle in excess of the sum of \$10 per annum for motor vehicles of 35 horsepower or less, used for the transportation of persons, or more than \$20 per annum for motor vehicles of more than 35 horsepower used for the transportation of persons, from and after May 1, 1912."

No permit or license to use or operate a motor vehicle, other than that issued by the



secretary of state under this act, is required. Section 12.

The owners of a motor vehicle or motor bicycle cannot be required to display upon such motor vehicle or motor bicycle any other number than that appearing upon the registration seal issued to him by the secretary of state. Section 3.

Chauffeurs—No person can operate or drive a motor vehicle, as a chauffeur, upon a public highway in this state, after January 1, 1912, unless he shall have complied with the requirements of this law as to the licensing of chauffeurs.

All chauffeurs' licenses issued under this act prior to December 31, 1912, will expire on that date. Section 13.

Application for Chauffeur's License—Application for chauffeurs' licenses may be made by mail, or otherwise, to the secretary of state, upon blanks furnished by him. All applications must be verified by the oath of the applicant and be accompanied by a fee of \$5 and by such number of photographs of the applicant, taken within 30 days of the date of filing such application, and in such form as the secretary of state may require. Section 13.

Qualifications of Chauffeurs—Before a license will issue to an applicant for chauffeur's license, he must pass such an examination as to his qualifications as the secretary of state may require. No person under 18 years of age can receive a chauffeur's license. No license will issue until the secretary of state, or his duly authorized agent, is satisfied that the applicant is a proper person to receive it.

The secretary of state must appoint examiners and cause examinations of persons applying for chauffeurs' licenses to be held at convenient points throughout the state as often as may be necessary. Section 13.

Chauffeurs' Licenses—A distinguishing number or mark must be assigned to each chauffeur to whom a license is issued. The license must contain the distinctive number or mark assigned to the chauffeur, his name, place of residence and address, a brief description of such chauffeur for the purposes of identification, and his photograph. The chauffeur must endorse his usual signature upon the margin of the license immediately upon receipt thereof, and such license is not valid until so endorsed.

A chauffeur's license may contain special restrictions and limitations concerning the type of motor car, horsepower, and other features of the motor vehicle which the chauffeur is authorized to operate. Section 13.

Chauffeurs' Badges—In addition to the license, the secretary of state must furnish each chauffeur licensed with a suitable metal badge, with the distinguishing number or mark assigned to him thereon, without charge, which badge the chauffeur must wear pinned upon his clothing upon a conspicuous place at all times while driving a motor vehicle on the public highway. Such badge is valid for the same period as the license of the chauffeur. No chauffeur can permit or allow any other person to have, possess or use his license or badge, and it is an offense for any person operating or driving a motor vehicle to use or have in his possession the license or badge of another, or to use a fictitious license or badge. Section 14.

Non-Resident Chauffeurs—A non-resident chauffeur who is registered under the provisions of the law of a foreign country, state, territory, or federal district of which he is a resident, where the requirements are substantially the same as in this state, is exempt from the provisions of this statute relative to the licensing of chauffeurs. Section 13.

Renewal of Chauffeurs' Licenses—Chauffeurs' licenses must be renewed annually after December 31, 1912. The fee for renewal is \$3. All renewals take effect on January 1 of each year and expire December 31. Section 14.

Intoxication of Chauffeurs—If it be made to appear to the satisfaction of the secretary of state that any licensed chauffeur has driven or operated any motor vehicle in this state while intoxicated, the license of such chauffeur cannot be renewed for a period of one year after the expiration thereof. Section 13.

Use of Vehicle Without Owner's Consent—It is an offense for any chauffeur or other person to drive or operate a motor vehicle or motor bicycle upon any street or highway in this state, in the absence of the owner, without having obtained his consent so to do. Section 15.

Acceptance of Bonus or Discount—It is an offense for any chauffeur or other person, having the care of a motor vehicle for another, to receive or take, directly or indirectly, any bonus, discount or other consideration for the purchase of supplies or parts, work or labor done on such motor vehicle by another, or for any person furnishing such supplies, parts, or labor to give or offer any bonus, discount or considera-



tion to a chauffeur or other person having charge of a motor vehicle for another. Section 15.

Machinery Left Running—It is an offense to permit any part of the machinery of a motor vehicle or motor bicycle to be left running while such motor vehicle or motor bicycle is standing without an attendant, on any public highway of this state. Section 9.

Brakes and Horns—All motor vehicles and motor bicycles, while in use on the public highways in this state, must be provided with good and sufficient brakes and with a suitable bell, horn, or other signaling device. Section 9.

Lamps—From sunset to 1 hour before sunrise, while upon the public highways of this state, every motor bicycle must carry one lamp, and every motor vehicle two lamps, lighted so that the lights will be visible at least 200 feet in the direction toward which such motor bicycle or motor vehicle is proceeding, and each motor vehicle must carry at least one lighted lamp so situated as to throw a red light visible in the reverse direction.

The number plate at the back of the motor vehicle must be so lighted that the number on such plate will be legible and intelligible at a distance of 150 feet.

It is permissible to use a rear number plate other than that furnished by the secretary of state, if such plate and the numbers thereon agree exactly in color, shape and size with the number plate provided by the secretary of state.

The light illuminating the rear number does not comply with the requirements of the law if it can be controlled from the inside of the motor vehicle. Section 4.

Speed—The act provides:

"No person shall drive a motor vehicle or motor bicycle upon any public highway in this state at a speed greater than is reasonable and proper, having regard to the traffic and the use of the way, or so as to endanger the life or limb or injure the property of any person." Section 10.

The following rates of speed, when exceeded, will be deemed prima facie evidence that the person operating the motor vehicle or motor bicycle is driving the same at a speed greater than is reasonable and proper:

When passing through the closely built up business portions of any incorporated city, town or village, 10 miles an hour;

When passing through the residence portion of any incorporated city, town or village, 15 miles an hour;

Outside of the closely built up business portion and residence portion within any incorporated city, town or village, 20 miles an hour;

Outside the limits of any incorporated city, town or village, 25 miles an hour;

When going around any corner, or curve, on the public highway, where the operator's view of the road traffic is obstructed, 6 miles an hour.

Section 10.

Racing is not permitted upon the public highway in this state. Section 11.

Restrictions as to speed do not apply to speedways created or maintained by the local authorities of any city, village, town or other municipal corporation. Section 12.

No incorporated town, city or village or other municipal corporation can pass an ordinance, resolution or by-law limiting or restricting the speed of motor vehicles or motor bicycles, and all ordinances now in existence or that may be hereafter passed by any city, village, town or other municipal corporation within this state, limiting the use or speed of a motor vehicle, are without effect or validity.

The owner of a motor vehicle or motor bicycle, registered under this act, cannot be limited in the free use of his motor vehicle or motor bicycle, or limited as to the speed upon any public highway or other public place at any time when the same is open to persons using other vehicles, nor is he required to comply with the provisions or conditions as to the use of motor vehicles and motor bicycles, not authorized by this act. Section 12.

Certain Local Regulations Permitted—The local authorities having jurisdiction over public parks can impose reasonable ordinances, rules or regulation concerning speed, within such park, but the rate of speed fixed for motor vehicles and motor bicycles must not be lower than that provided for other vehicles within such park. Where ordinances, rules or regulations are made regulating the speed, the rate of speed must be indicated by signs conspicuously placed.

The authorities having jurisdiction over cemeteries or grounds used for the burial

of the dead may exclude motor vehicles and motor bicycles therefrom.

Municipal corporations can make and enforce ordinances, rules and regulations affecting motor trucks and motor-driven commercial vehicles, and motor vehicles which are used within their limits for public hire, and make and enforce reasonable traffic and other regulations, except as to rate of speed, if they are not inconsistent with the provisions of this act. Section 12.

Meeting and Passing—The driver of a motor vehicle or motor bicycle, upon approaching a person walking upon the public highway, or horse or other draft or domestic animal or animals being ridden, led or driven thereon, must give reasonable warning of his approach and use every reasonable precaution to avoid injuring such person, or frightening or causing injury to such animals, and, if necessary, such driver must stop his motor vehicle or motor bicycle until it is safe to proceed.

Whenever a person operating a motor vehicle on a public highway meets any person driving a horse or other draft animal or any other vehicle, the person operating the motor vehicle and the person so met must each seasonably turn to the right of the center of the beaten track of such highway, so as to pass without interference.

Whenever the driver of a motor vehicle or motor bicycle overtakes any person riding or driving upon the public highway, he must pass to the left side of such person, and the person about to be passed, as soon as practicable, upon signal, must turn to the right of the center of the beaten track, so as to permit the driver of such motor vehicle or motor bicycle free passage to the left.

When the driver of a motor vehicle or motor bicycle turns from one public highway on to another (at an intersection), he must keep to the right of the center of such intersection, whether he turns to the right or to the left. Section 16.

Injury to Person or Property—In case of any injury to the person or property of another upon the public highway, due to the presence or operation of a motor vehicle or motor bicycle, the driver of such motor vehicle or motor bicycle must stop and, if requested by the person injured, or any one present, give his name and address, and if he be not the owner of such motor vehicle or motor bicycle, in addition to giving his own name and address, give the name and address of the owner. Section 16.

Disposition of Registration Fees—The secretary of state first pays the cost of procuring and delivering the registration certificates, registration seals and number plates from the registration and license fees paid to him. The balance must be deposited in the state treasury, and set apart as a special road fund, to be used solely for the permanent improvement of the highways of the state outside of incorporated cities, towns and villages, and can be appropriated by the general assembly for no other purpose. The amount to be appropriated and expended from such fund in any county for permanent improvement of the highways within its limits for any one year will be in the same proportion as the amount levied in each county for road and bridge taxes bears to the total amount of road and bridge taxes levied in all counties of the state. Section 19.

Damage Suits—The requirements of the act as to registration and the regulations relative to speed and operation of motor vehicles and motor bicycles are not to be construed as depriving any person receiving injuries either to his person or property, resulting from the negligent use of a motor vehicle or a motor bicycle, from bringing an action for civil damages for such injuries. The act provides:

"In any action brought to recover any damages for injury either to person or property caused by running any motor vehicle or motor bicycle at a rate of speed greater than is reasonable and proper having regard for the traffic and the use of the way, or so as to endanger the life or limb or injure the property of any person, the plaintiff or plaintiffs shall be deemed to have made out a prima facie case by showing the fact of such injury and that the person or persons driving such motor vehicle or motor bicycle was at the time of such injury running the same at a speed greater than was reasonable and proper having regard for the traffic and the use of the way or so as to endanger the life or limb or injure the property of any person." Section 17.

Penalties—Penalties varying from \$10 to \$200 are provided for violations of the several provisions of the statute hereinbefore referred to, and for second offenses the certificate of registration or license may be revoked by the secretary of state for a period of 3 months; for third or subsequent offenses, the license may be revoked for a period of 6 months. Section 18.

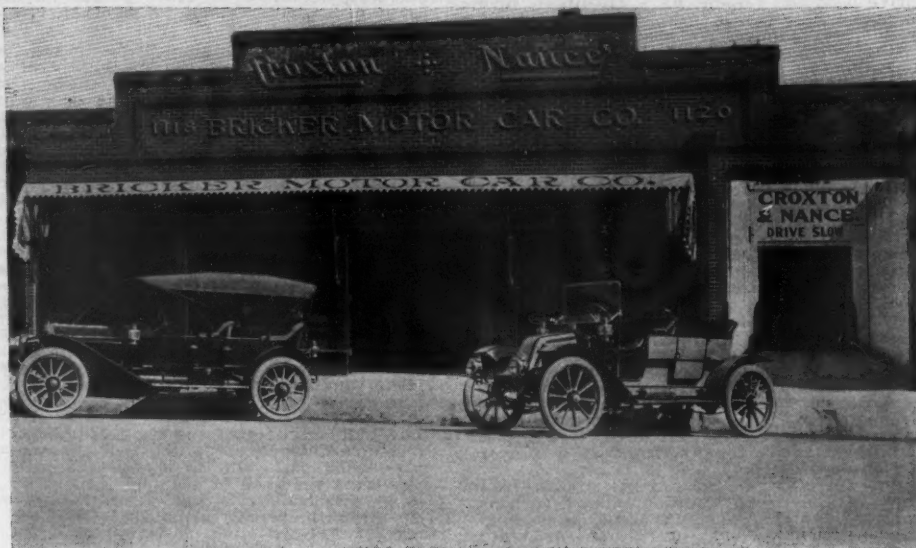
ADDED to the Board—At a recent meeting of the board of directors of the Licensed Automobile Dealers of the City of New York, Harry M. Bronner of the Stoddard and C. H. Larson of the Oldsmobile were elected directors.

Another Kissell Addition—The Kissell Motor Car Co., of Hartford, Wis., has purchased a tract of 1 acre adjoining its present holdings and will proceed at once with the erection of a new factory building, which will be 100 by 200 feet in size, four stories high, with 14-foot ceilings. The building will be used for assembling, warehouse purposes and stock room. The plant already is one of the largest in the west.

An Electric Record—Four officials of the Edison Electric Illuminating Co. of Boston made a run in an electric machine a few days ago which is claimed to be a record for that section. It was a five-passenger electric and the route led through Mattapan, Canton, Sharon, Walpole, Medfield, Sherborn, Ashland, Framingham, Wellesley, Natick, the Newtons back to Boston. The car weighed 2,800 pounds and the passengers 750 more, and 64 miles were covered, part of it through the Blue Hills, which required hill climbing. The last 23 miles were made in 1 hour 17 minutes.

Licensed Dealers Reorganize—For several months past the members of the Licensed Automobile Dealers of the city of New York have been working on a reorganization plan, the necessity for which was caused by the recent decision in the Selden patent case. This move has been expected by the trade for a long time, and the delay in the reorganization has been caused by the members awaiting the reorganization of the Association of Licensed Automobile Manufacturers, the parent body. It was decided to await the result of this reorganization, which is now completed in the Automobile Board of Trade, before taking any steps to form a new association. The charter for the new association was filed in Hartford recently and it will be known as the Automobile Dealers' Association, In-

Among the Makers



HOME OF BRUCKER MOTOR CAR CO., LOS ANGELES

corporated. The charter as filed is a very broad one and the main object of the association will be the protection of the industry, particularly in the city of New York.

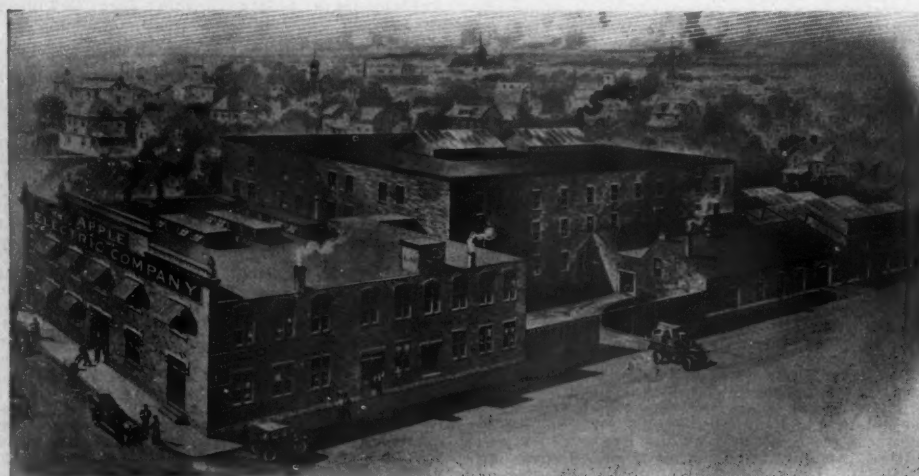
Standard Welding Changes—The Standard Welding Co. announces the resignation of W. H. Pirrong, sales manager of the rim department, and the appointment of J. C. Manternach, sales manager tube department, as general manager of sales.

Lozier Branch in Frisco—The Lozier Motor Co. of Detroit has established a factory branch sales department in San Francisco and hereafter will handle its car in this territory through its own medium. The Lozier has been represented in northern California for the past year by the Pioneer Automobile Co. The latter firm also handles the Chalmers and Hudson lines, and it was mutually agreed that the Lozier would be better handled individually. Already a branch salesroom has been opened at 455 Golden Gate

avenue. This is in charge of F. B. Keip. J. R. Hall, also from the Lozier factory, will make his headquarters here as mechanical expert. It is announced that the Pioneer Automobile Co. will take on another line of cars.

Firestone Picnic—About 1,500 employees of the Firestone Tire and Rubber Co. of Akron, Ohio, enjoyed their annual outing at Cedar Point, Ohio, June 24. Special trains were provided by the company to convey the picnickers from Akron to Sandusky, where boats were taken for Cedar Point.

Ohio Electric in New Plant—The Ohio Electric Car Co. has moved into its new home at Baneroft street. The plant, which was constructed at a cost of \$125,000, is not yet completed, but was far enough along to make it possible for the company to move in. Two years ago the Ohio company started to build electrics in a small space in the Milburn Wagon Co.'s plant and its business increased so rapidly that its factory space was increased several times the first year. The growth of the concern was of such proportions that it was impossible to secure enough space at the Milburn Wagon Co.'s plant, and the new building became a necessity. The structure is 240 feet long, 60 feet wide, three stories high and of modern mill construction throughout. At present the company is turning out a car a day, but the capacity will be at once increased to three a day. In the past nothing but pleasure cars have been constructed, but in the future it is planned to build an electric truck with from 1,000 to 1,500 pounds capacity. Sample trucks are now in the process of construction. The stock was recently increased from \$150,000 to \$250,000. The officers of the company are: F. H. Dodge, president;



NEW FACTORY BUILDING OF APPLE ELECTRIC CO., DAYTON, O.